SUPPLEMENT.

The Mining Journal,

RAILWAY AND COMMERCIAL GAZETTE:

FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.

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Original Correspondence.

THE SCOTCH IRON TRADE—No. XII.

THE CLYDE IRONWORKS.

In a former article we remarked that the ironworks of Scotland embraced three geographical divisions—the east coast, the west coast, and the neighbourhood of Glasgow and Coatbridge. But the Clyde Ironworks stand isolated from all three. They occupy a position on the north bank of the Clyde near to the village of Tollcross, about four miles above Glasgow. There are no other works situated near them, and they have maintained their out of the way *locale* for nearly a century, during which time they have been in the hands of four different proprietors. With the exception of the Carron and Muirkirk Ironworks, those which bear the name of the Clyde are the oldest in Scotland. Commenced in the year 1788, the Clyde Ironworks, albeit they have now got into a prosperous groove, have passed through many vicissitudes. They have always, however, enjoyed access to a very excellent and ample mineral field, lying round about, and they have further, from their earliest years, been provided with the most complete facilities of transit by means of that great highway, the Clyde. At the time they were projected railways were unknown, and for all practical purposes horse-power was the only available means of conveyance. At that time, too, the science of the steam-engine was in its infancy. One of the first engines of its kind made in the world was erected at the Clyde Works, the makers being James Watt himself, and his partner, Boulton. It was a very crude and, in the light of the present day, a very clumsy and defective production. Its working parts were partly of wood, and partly of iron—the beam being of the former material. Yet it was sufficient for all the requirements of the Clyde Ironworks, and continued to do its work tolerably well until the year 1839, when a new and improved engine, built by Murdoch and Aitken, of Glasgow, was introduced. Watt's engine, however, is still retained on the premises. It has been modernised and made more workable from time to time, until it now presents a tolerably respectable appearance, and in case of an emergency it could still be made to do good work.

The orginal promoter of the Clyde Ironworks was, we believe, a Mr. Outram, who carried them on with tolerable success for a number of years. At the time of his management there was a large foundry carried on in connection with the works, at which cannon were made for the British Government, similar to the carronades from which the Carron Ironworks achieved such a world-wide fame. In course of time, however, this foundry fell into disuetude, and it has been turned into workshops for the manufacture and repair of the locomotives and other appliances used in connection with the furnaces, under the management of the present proprietors. Subsequently, the works passed into the hands of a Mr. Edington—a relative of the proprietors of the Phœnix Foundry—who was succeeded, about the year 1813, by Mr. Colin Dunlop, the uncle of the present proprietor. When Mr. Dunlop acquired the works there were only three furnaces built. He added a fourth, and afterwards a fifth furnace; and since Mr. James Dunlop, the present owner, came into possession the works have been extended to six furnaces. The annual make of the three furnaces in blast previous to the year 1820 was only 4500 tons. Now, under the altered conditions of hot-blast and other improvements, the works are equal to an annual production of 8500 tons per furnace per annum, the aggregate yearly make being thus about 45,000 to 50,000 tons. It is a well attested fact in the history of the Clyde Ironworks that even with pig-iron selling at 13*l.* per ton—a figure that is utterly impossible of attainment now-a-days—the trade was in anything but a flourishing condition. This was due to the enormous cost of material and labour required to produce pig-iron by the cold-blast. Before the era of the hot-blast coke had to be used in the furnaces, and as Scotch coal is not capable of being converted into coke except at a great sacrifice, it usually required from 7 to 8 tons of coal to make 1 ton of iron. When, however, the hot-blast enabled ironmasters to dispense with coke and use the raw coal, the consumption of the latter was reduced to 2½ tons per ton of iron smelted. The charge used at the Clyde Ironworks for No. 1 iron is in the proportion of 13 cwt. of coal to 11 cwt. of ironstone, with ½ cwt. of limestone.

There are only five furnaces in blast at the Clyde Ironworks at the present time. The sixth furnace is being re-lined and otherwise repaired; but it is expected to be in blast next month. The original height of the furnaces was 42 ft.; but they have been raised from time to time until they attained their present elevation, which is 53 ft. A bank, off which the furnaces are filled, is caried half way up, and from this height the minerals are raised to the charging ports by a hoist of the usual kind, worked by a small engine. Mr. Dunlop is just now directing his attention to the results obtained by the bell and cone arrangement, and it is probable that before long he will adapt his furnaces to this system, and at the same time take measures to secure the utilisation of the furnace gases. Indeed, the whole of the Scotch ironmasters, being driven by the exhaustion of the blackband ironstone to a more general use of clayband, will be compelled as a consequence to give their furnaces the extra height that is necessary to the efficient smelting of clayband—the latter requiring a much larger body of heat in the furnace than blackband. But, besides this, it is now generally admitted that the bell and cone system is an improvement on the old style of open-topped furnaces, and the more general introduction of the close top will involve as its necessary carollary an increased elevation of from 20 to 30 ft., for the purpose of giving fair play to the coking process.

In regard to the motive power used, or capable of being used, at the Clyde Ironworks, it may be mentioned that in addion to Watt's engine, already alluded to, and the single-beam engine introduced in 1839, and made by Murdoch and Aitken, there is a pair of coupled beam-engines, sufficiently powerful to supply blast to the whole of the furnaces. The blowing-cylinder of these engines are 111 in. diameter, and its other parts are of corresponding size. It was also built by Murdoch and Aitken, and being of recent introduction it is supplied with many improvements that are wanted in the other two. The single-beam engine is capable of blowing three furnaces, and Watt's engine, even at this time of day, could be adapted to blow two. Fine large boilers generate steam for the coupled engines, there being four boilers for each of the other two. All the boilers in use are fitted up with Galloway's conical tubes, and other aids to economy appear to be studied in the management of the works.

For many years the Clyde Ironworks derived their supplies of ironstone and coal from their immediate vicinity, but as these deposits became exhausted the proprietor was compelled to seek for "fresh fields and pastures new," until the great bulk of the minerals is now brought from a distance that was never dreamt of when the works were first undertaken. At Robroyston, a distance of eight or nine miles from the Clyde Ironworks, by the Caledonian Railway, Mr. Dunlop has a lease of 800 or 900 acres of ground, from which a large proportion of the ironstone is taken. On this estate Mr. Dunlop has already sunk two pits, which have been in constant operation for some years; a third shaft is in course of being put down. The depth of both pits is about 120 fathoms. Other two pits are worked at Linwood, where Mr. Dunlop has had a lease of the minerals for a period of 15 years past. There is a third field of ironstone belonging to the Clyde Works, in the immediate neighbourhood of Glasgow, and near to the Gartnavel Royal Lunatic Asylum. The minerals on this field are conveyed by a very circuitous route, being first carted to the Temple Locks, thence they are conveyed by the Monkland Canal, *viâ* Coatbridge, to the Caledonian Railway, which ultimately delivers them at the Clyde Works. In addition to the fields we have named, Mr. Dunlop has other leases of minerals at Cardonald on the Paisley and Glasgow Joint Railway, extending to 400 or 500 acres; and at High Blantyre, near Hamilton, on the estate of Lord Blantyre. On the former of these fields one pit has been sunk, and is now being worked at the depth of 45 fathoms; while on the latter estate there are two pits, both of them having been sunk recently. The coal used at the Clyde Works is chiefly obtained on the Carmyle estate, immediately adjoining where Mr. Dunlop is proprietor of 700 acres, and where two pits have been in constant operation for many years. The deepest of these pits is 80 fms. to the splint coal. Besides another small lease at Kenmure, on Mr. Finlay's estate, where one pit is being worked, Mr. Dunlop has lately acquired a considerable field on the Duke of Hamilton's estate, on the opposite side of the Clyde, at a place called Hallside. Here one pit is being sunk to the depth of 130 fathoms, but it will not be ready for use for at least two years to come. Adjoining the new field, there is another extending to about 700 acres, which belongs to Montgomery, of Newton, and in which one pit is now being worked with an average output of 1000 tons per fortnight. Mr. Dunlop has no limestone fields.

There are upwards of 300 men employed at the Clyde Ironworks, but the total number of Mr. Dunlop's employees will not fall short of 1500. The average consumption of coal at the works is 2 tons, 15 cwt. per ton of iron made, and assuming the annual production of the latter to be 50,000 tons, the total quantity of coal used at the works cannot fall much short of 150,000 tons per annum.

IRONWORKS AND COLLIERIES IN YORKSHIRE.

WOMBWELL MAIN COLLIERY.

Wombwell, four miles distant from Barnsley, is now one of the chief centres of the coal interest in Yorkshire, and is rapidly increasing in importance, and assuming the proportions of a town. Close to the village are the Darfield Main, Lund Hill (where 189 lives were lost in 1857 by an explosion of gas), and the Wombwell Main Collieries, whilst Mr. Bartholomew and Mr. Mitchell are each engaged just now in opening out large mines to the Barnsley or Thick Coal. The largest of the collieries in the locality is that known as the Wombwell Main, having a capacity for raising upwards of 1000 tons of coal daily. The quality of the seam is very good, and there is an excellent demand for it, a considerable tonnage going to London and the South, whilst a long train of wagons is sent daily to Grimsby direct for shipment by the well-known merchant, M. Josse. Like many other collieries in South Yorkshire, Wombwell Main has suffered from accumulation of gas, and so far back as 1862 the coal got on fire, and was with great difficulty extinguished, at a cost, it is said, of 24,000*l.* The works were closed for a considerable time in consequence, and men encased in diving-bell dresses had to be employed in making the necessary explorations. The colliery is well laid out, having all the essentials required for doing a very large trade, together with the requisite workshops, The total depth of the colliery is 224 yards 1 foot 11 in., the coal being 7 feet 11 in. thick. Below the Thick coal is the Silkstone seam, the difference between the two being about 380 yards. As yet, however, the Silkstone seam has not been sunk to from the Barnsley bed, but there is now talk of such being about to be done in more than one part of South Yorkshire. Between the surface and the Barnsley coal there are several seams of varying thicknesses, but not being worked at any of the large collieries. The following beds have been passed through at the Wombwell Main Colliery before the Thick coal was reached:—

	yds.	ft.	in.
Melton, or Wathwood top coal	0	2	11
Dirt	0	1	1
Bottom coal	0	0	6
Half-yard coal	0	1	5
ditto	0	1	3
ditto	0	0	9
Abdy, or Winter coal	0	2	7
Kent Thin coal	0	2	1
Coal	0	1	10
Kent Thick coal (with spavin between)	0	3	2
The Ten-inch coal	0	0	11
The Barnsley Thick coal	0	7	11

There are two drawing shafts in operation, 12 feet diameter, whilst there is also a third shaft, which can be used for drawing if necessary. The head gearing is about 30 feet from the bank, the pulley being 14 feet 6 in. in diameter, with single-decked cages. Flat wire-ropes are those used in drawing. The ventilation is by the ordinary furnace method, whilst the coal is brought along the dips and levels by means of a wire tail rope, worked by engines on the surface. On the banks there are several screens which the coal passes over before going into the railway wagons, and there are also the weighing machines, with offices for the colliery and check weighmen.

In the No. 1 pit there are a pair of coupled vertical drawing engines, 25-in. cylinders, each of 50-horse power. The steam for all the engines is produced by eight boilers, six of them Cornish, between 30 and 40 feet in length; the engines are by John Musgrave, Bolton. At the No. 2 shaft there are a pair of similar engines, coupled, by the same maker, and of the same power. There is also a very fine chimney-stack close to the pits. At the No. 3 shaft there is a small horizontal engine, which is occasionally used in drawing out the men, and is always available in case of an emergency. The pits are well ventilated, and there are two upcasts or cupola shafts. The tail rope is worked by a pair of 25-in. cylinder engines. Close to the two pits there is a shop where the picks are sharpened, so that there is no delay in going to and from the working places with the tools.

The coal being well adapted for coking purposes, there is a large quantity produced at Wombwell Main, so that full advantage of the existing high prices for every description of coke is realised. At a short distance from the drawing pits there are two ranges, comprising 86 ovens, most of which are kept going, so that the out-put is very considerable, but nothing equal to the demand.

In all departments labour and unnecessary outlay are well looked after, for we found that so far from the firm sending the ordinary work away to the engineers in Sheffield or Barnsley, they had made ample provisions at their own place. In one room we found a well-arranged fitting shop, with a couple of good lathes, with screwing and drilling machines, propelled by a small horizontal engine, where a great deal of work is turned out. Near to the same shop is a large carpenters' place, where the corves are turned out. There is also a large blacksmiths' shop, most admirably fitted up, with engine power complete. In thus briefly noticing one of the finest collieries in South Yorkshire, we must not omit to state that the proprietors, including Mr. C. Bartholomew, of Doncaster, Mr. Baxter, of London, and Mr. Roberts, of Sheffield, have been most assiduous in looking after the welfare of those in their employment, as well as their families. Close to the colliery there are about 100 houses belonging to the firm, together with a school for the children. Wombwell is also well off, so far as public places of worship is concerned, and of late years Mr. Bartholomew and his *confreres* have been very liberal persons to all bodies who have shown a disposition to give increased facilities for the education of the young or the moral improvements of the adults, and they have succeeded in enlisting the services of a body of workmen of which any mining firm might be proud. The officials also, including Mr. Blythe, the very courteous manager, seem more disposed to meet the wishes of the men in a fair and open spirit, discussing any alleged grievancies they may have, than by entirely ignoring all and every claim, as is sometimes done.

THE SLATE DISTRICTS OF NORTH WALES—No. II.

The formation of slate is one of the most interesting subjects of geological study, as it affords the means of understanding certain phenomena otherwise difficult to explain, and points out with great clearness the changes that portion of the earth in which it is found has undergone, and the actions it has been subjected to. It is now the generally received opinion that "cleavage" is the result of intense pressure, caused by powerful subterraneous movements applied to deeply-seated deposits, producing a flattening and elongation of the particles composing the rock, and an alteration of the axis in which they are arranged. The effect of this new arrangement is to place the long axis of the particles approximately at right angles to the direction of the disposing force, which, probably, has been slowly and gradually applied obliquely to different portions of their opposite sides in contrary directions at the same time, thus causing them to partially rotate upon their axis, but not otherwise changing their relative positions. Indeed the cleavage of slate is more like the separation of the layers of pasteboard than the splitting of stone, and it may be said to tear open rather than to split.

The cleavage planes thus formed differ from those of bedding somewhat in proportion to the dislocation of the rock; the angles being small and nearly coincident in the flattest rocks, greatest and most distinct in the more elevated. It is, therefore, probable that the cleavage which exists more or less in all the sedimentary rocks of this period is the effect of a subterraneous force which, by slow and gradual movements, lifted them when situated deep below the surface of the earth from their original horizontal positions into the more upright ones they now hold; whilst to more violent disturbance subsequently, and to denudation, they owe their present relations and exposure.

From a close observation of the chemical and mechanical composition of slate, and of the situations in which the different veins are found, we best discover and understand the conditions under which they have been formed, and which have produced that perfection of cleavage in one direction, accompanied by a toughness and closeness of texture in every other, that constitutes the chief value of true slate, and distinguishes it from all other varieties of stone, however similar in appearance. The chemical composition of the best slate is analogous to that of the purest clay; and like that substance also, in mechanical composition it is purely homogeneous, and of a fibrous adhesive texture. But as clay may vary in composition from the finest pottery clay to the coarsest brick earth and loam, so may vary, as they are frequently seen to do, though deposited in the same horizon and continuations of the same strata. Slate, though a metamorphic rock, is not crystalline but fibrous in its fracture, retaining the marks of its laminated texture, a form which is beautifully seen in what is termed "the grain" of freshly-split slate. It will be readily understood that the nature and form of these constituent particles, and the circumstances under which the pressure is applied, will be material elements in the perfection or otherwise of the cleavage; that the finer and more homogeneous the particles of the rock are, and the more regular and evenly applied the pressure, the more perfect, close, and smooth will be the planes of cleavage. In true slate this is illustrated in the best manner, and the purer the slate the better the illustration. The process of metamorphism, therefore, has been incomplete. No fossil remains of any kind whatever have yet been found in pure roofing slate, and the presence of a fossil in a rock proposed to be worked for this material would make a person practically conversant with the character of slate rock at once condemn it; a fact which, had it been more generally known and acted upon, would have saved thousands the pain of disappointment and of serious pecuniary loss.

The cause of this homogeneity is probably to be found in the situation and circumstanes in which it was deposited. Evidently in hollows or basins at the bottom of the deep sea, deep enough to be unaffected by tides or waves, and sufficiently distant from the shore to have allowed the coarser particles to fall before reaching them, leaving only the finest portions of the mud held in solution slowly to subside, in the intervals of quiescence, during a period of gentle volcanic action. That such were the conditions and situations in which the slate deposits were formed may be gathered from the positions the different beds or veins hold in relation to one another.

This, though the same in their general contour in each case, will be better understood from what is shown by the smaller and more horizontal Silurian beds of Festiniog, than in the extensive and extremely dislocated veins of the Cambrian formation. In the sections of ground made by the quarrying operations near that village the beds are seen to lie one above the other, not in regular parallel lines, but almost in the form of waves, the thin parts of one dovetailing between the thicker bodies of those above and below, as thus—

with the intervening bands of hard rock thinning and bellying out in a somewhat similar manner, enclosing the slate beds, as it were, in cases. In the Cambrian system the hard bands are formed by veins of quartzose grit, thinly intermingled with grains of felspar; but at Festiniog they are almost entirely felspathic, and occasionally slightly talcose. Whether these latter were originally deposited in the form of melted lava run over the surface of the mud, or of showers of scoriæ, which have since become consolidated into rock as hard as the melted lava, is impossible to say; but that probably both forms obtained may be inferred from the condition of the upper surfaces of the beds, which in some cases are more or less porcelainised by contact with the burning lava, in others are hardened and made coarse, evidently by admixture of sand and ash with the purer and more plastic mud. In both cases, however, the slate is rendered worthless for some portion of its thickness, which under the name of bastard is rejected by the quarrymen, though much of it can be manufactured into rough slates and slabs. A misunderstanding of these facts has led to many unfortunate adventures; persons even of considerable experience having been induced to open quarries in worthless rocks because at the top coarse slates could be made, under the impression that the material would improve as they got deeper. We have seen instances, indeed, where the fruitless search has been persevered in to the extent of hundreds of feet below the surface. But, however formed, in the production of true slate these bands of trap have played a very important part in two ways:—first, by subjecting the clay deposit to a slight baking process, the necessity for which may be inferred from the invariable presence in slate veins of some form of fused rock, either as intruded greenstone or these felspathic bands, sometimes even of both of them; secondly, by their modifying effect upon the pressure which caused the cleavage. It will at once be seen what a different effect pressure would have upon a soft rock-like crude slate as to its ultimate form, whether it was applied to it in comparatively small quantities in hard cases, such as have been described, or in large, unprotected, and loose masses. In the first case the enclosed matter would be made more solid and compact, and more uniform in its consistence, by compression; all bends and twists would be flattened and made smoother, and the cleavage planes more regular in consequence. In the other, any variety of consistence or imperfection of form existing at the time would rather be increased than diminished; and if the compressing action were at all irregular, additional contortion and damage to the rock would probably surpervene. To the fact of the slate beds being enclosed in these harder and more unyielding bands, at the time when they were subjected to the tremendous pressure which produced their cleavage, is, we believe, to be attributed that peculiarity of texture which has been pointed out. We know of no instance of good slate being found in any place except under these conditions, and the opinion that something of the sort is essential is strengthened by the fact that one of the upper veins in the district under notice, which lies upon a hard band, but is not overlaid by or enclosed within another, produces only soft, perishable, coarsely cleaved slates for a very considerable portion of its thickness; in fact, until the rock gets within the modifying and protecting influence of the underlying trap, and even then its quality is very inferior to that of the veins situated as above described.

The grounds upon which this theory of slate formation is based are, as has been said, seen best in the Festiniog quarries, where the process has been carried out, so to speak, on a small scale, and with but little complication. But in the older and larger Cambrian deposits the same conditions obtain, though from the wider extent of the beds, and greater amount of dislocation they have undergone, these are not so observable or easy to make out at first sight. In them the slate veins are much thicker and extend further than those at Festiniog; and, instead of being enclosed by bands of volcanic trap, are placed between the layers of hard, unyielding grit before mentioned, which have had, however, the same modifying effect upon the pressure. The whole deposits lie upon an immense mass of metamorphosed porphyry, which underwent the operation of fusion after the deposition of the slate-producing mud, and probably at the time when the disturbance took place that caused the cleavage. They are, moreover, cut across by numerous dykes of intrusive greenstone, perhaps, also, contemporaneous with the same disturbance. The Cambrian slate is of a coarser texture than the Silurian—more silica, with some mica and chlorite being mixed with the finer aluminous clay; but from the greater depth at which it was situated when the converting influences were brought to bear upon it, and the more intense force with which they were applied, the metamorphism is more complete, and the cleavage almost as perfect as in the later and finer deposits.

Bnt to obtain marketable slates in such quantities as to make a quarry profitable, it is not alone sufficient that the slate material be fine and homogeneous, and been subjected to the cleavage-producing pressure under the exceptionally favourable circumstances mentioned. It is necessary also that the ground should not have been affected subsequently by such violent disturbance as to crush the veins, and render them jointy and distorted; and hence it is that, as a rule, slate quarries in flat ground are more profitable than those in steep or precipitous places, because yielding a greater quantity of large-sized slates and slabs.

SELF-EXTINGUISHING MINERS' LAMPS.

SIR,—So much has been written upon miners' safety-lamps, and so many modifications of the Davey, Stephenson, and Mueseler have been from time to time brought forward, that it is not surprising that an inventor now finds it difficult to sustain his claims to novelty; but in many cases this matters but little, because the so-called new lamps are often constructed upon a principle which experience has proved to be objectionable. The lamp recently introduced by Mr. Henry Plymsoll is one of this class: it is so arranged that it will not burn in an explosive mixture, and this, however good it might be in other respects, would most effectually prevent its general adoption. It was this very disadvantage that prevented the Stephenson lamp coming into such general use as the Davy. Stephenson's lamp was arranged to avoid explosion by starving out the flame when in an explosive atmosphere; Davy's was constructed upon more philosophical principles, and relied upon the cooling effect of the gauze. Mr. Plimsoll's is upon the Stephenson principle, which is probably the safer of the two, but as it necessitates the risk of leaving a man in darkness just at the moment when even the dull blue flame of the gas-charged Davy is invaluable, it is only in certain districts that the Stephenson has ever made much headway. In the Barnsley district, for example, the Stephenson is very commonly used; but in the North, and elsewhere, the Davy principle is generally preferred.

Indeed, the general opinion is that if a mine be properly examined any fairly constructed safety-lamps may be used, and will give the colliers ample notice of the approach of danger; and many add to this opinion the belief that if a mine be not well laid out and disciplined, safety-lamps are of very little use in preventing accidents. For the viewer and firemen of a mine no lamp approaches in utility and safety the ordinary Davy lamp; all that need be cared for being to use the lamps of a maker whose manufactures can be relied upon, such as Abbot, of Gateshead, or Watson, of Newcastle. For such examinations all "toy lamps" (for that is the technical name given by practical men to all patent lamps, and often, I am sorry to say, without consideration of their merits) should be avoided. It is an enormous evil for a fireman to be tempted to re-light his lamp when examining a mine, as the temptation is often too strong for him, and I will not say that the viewer would not sometimes be open to the same charge. Mr. Plimsoll's is doubtless a good lamp, but it has the objection that it is extinguished in an explosive atmosphere.

W. C. H.

THE EMMA MINING COMPANY.

SIR,—In your report of the proceedings of the shareholders' meeting of the Emma Silver Mining Company, held at the City Terminus Hotel, on Thursday last, as published in the Supplement to the *Mining Journal* of June 1, you do me the greatest possible injustice. I do not complain that you suppressed my remarks, but it seems exceedingly unfair that you should represent me as having said the *very opposite* of what I did say.

In your report of the meeting you said that—"Mr. Lyon then addressed the meeting at great length, entering into much details relative to an indefinite claim he had against the company in the position of original owner. He owned in answer to the demand of the meeting that in his dealings with the company's shares he had sold short, and such he regretted to say was his present position. The opinion to be gathered from his observations generally were, on the whole, decidedly favourable to the company, for he expressed himself, in the course of his remarks, although in rather ambiguous terms, as quite satisfied in regard to the value of the property, and of its prospect of future profitable returns."

The conclusions of the writer of this report, as expressed above, are in every *particular at direct variance* with what was said by me at the meeting.

I made no claim, definite or indefinite, against the company, as original owner or otherwise. I stated voluntarily that I had sold the company's shares short, and gave my reasons for doing so. I stated that I was then short of the shares, but did not say I regretted it, or use words from which such a conclusion could be inferred.

I did not indorse the company, or use language that could even by forced construction be made to appear favourable to it or its future prospects. I cannot think of wearying your readers with a detailed report of all that I said at the meeting; but, from the following remarks given as uttered verbatim, they can judge whether I was fairly reported, and whether *my observations were, on the whole, favourable to the present or future prospects of the company.* I stated that I was one of the discoverers of the so-called Emma Mine in 1868, and that I knew the condition and value of the property as well as any man; that I did not believe the shares worth 5*l.* per share, and that I knew of the making of the contract of December 9 between Mr. Park and the American shareholders; saw a duplicate of the same as early as November in the hands of Messrs. Park and Stewart in London, and that the whole consideration for the sale of the shares was expressed in the contract itself. I also stated that Mr. Park had, to my personal knowledge, within 60 days, offered his entire shares, 25,000, more or less, to a gentleman in London for 12*l.* per share. And this offer was made subsequent to the receipt of the reports of Messrs. Silliman, Willyams and Stewart on the property, and stated that Mr. Park was a seller of the shares as soon as these reports came to the London public, and continued such sales until the 8500 shares were applied for; and that Mr. Park told me that he had only shares sufficient unsold to fill the applications for the 8500 shares; and that, on a full knowledge of the above facts, I commenced my short sales. That Mr. W. M. Stewart had no shares or interest in the company, excepting 3000 shares, which he purchased from me in November last at 8*l.* per share, and 2000 shares (bonus) received from Mr. Park as consideration for becoming a director in the company, making his 5000 shares as stated in contract above referred to. I also stated that the present explorations and workings of the company were upon ground not owned by the company, or covered, constructively or otherwise, by the patent, and that the company were not now mining and extracting ores from their property, but from mining grounds adversely owned and held.

That the Emma Mine, as sold to the London company, and conveyed under the United States patent, was 200 ft. wide, running in a north-easterly and south-westerly direction, and contained no minerals of value, and that the company was now mining and extracting ores from a point 220 ft. distant from the centre of the ground covered by patent, in a north-westerly direction, as shown by Prof. Silliman's report, being in a line at right angles with the Emma Mine, and that the ground from which the ores are now being mined is held by prior location by parties calling it the Cincinnatti lode; and should the Emma Mining Company acquire this ground by purchase from the Cincinatti owners, they would then possess a mine of only 366 ft. in extent, as the vein extending beyond that point in a north-westerly direction is owned by Mr. James P. Bruner, of Philadelphia, who has owned and occupied the property since 1865, and has expended at least $100,000 in porchase and development. And I further stated that a letter had been received in London from Mr. James F. Woodman, one of the owners of the Illinois tunnel, stating that the Emma Mining Company was working in their grounds, and must discontinue such work or buy out the Illinois claim.

For the correctness of the foregoing report of my remarks I appeal to the recollection of every gentleman present at the meeting.

Langham Hotel, June 6. JAMES E. LYON.

MINING IN THE PACIFIC STATES AND TERRITORIES OF AMERICA

A FEW WORDS TO ENGLISH CAPITALISTS.

SIR,—Seeing that English capitalists have recently made many heavy investments in the mines of the Pacific States and Territories of U.S. America (where I have resided for sufficient length of time to acquire a general knowledge of the peculiarities of the country), I am induced to forward a few hints for publication in your valuable Journal, to guard those who may be disposed to invest from the many deplorable worthless schemes which are being continually introduced from these remote regions, so that legitimate developments may create mutual benefits to them and to the future mining of the vast mineral resources of this country.

Americans, having the concentrated knowledge of many peoples, and educated for the general requirements of this great interior, are the best explorers for minerals in the world—so that with the assistance during the past year of their long Trans-continental Railway they have discovered, amidst the multitude of poor ledges, many very valuable veins, in districts that were previously unknown and unavailable, which now lie awaiting sufficient capital for profitable development. The high rates of local interest, of from 12 to 24 per cent. (with good security), and still more profitable business investments, will, as it has done, prohibit its use for such purposes; and, as the richest properties must have some money for development and manipulation ere their values can be realised, European money may be invested to frequent advantage here, and to favour this desirable end the following facts should not be disregarded.

The first important consideration should be regarding the "title" to the property in question:—That of the U.S. Government "patent" stands impregnable to all legal assaults. The next best may be that obtained from the sheriff's sale for the satisfaction of a legally-obtained judgment from previous owners' liabilities. Then that of legal locators or pre-emptors, according to the miners' laws of the district, as booked by the authorised recorder. In any case where much money is demanded the title should be indisputable, or the claim, if rich, may be jumped in force, impoverished, or wrested away by law.

The next equally important question is as to the value of the property; and, as there are many poor mines here, as well as elsewhere, for one that is rich, the necessary preliminary precautions should be taken in discrimination, to prevent final ruinous misadventure. Most of the mines of this country can be valued at the surface or in early explorations by competent men—so that those errors that arise from judgment of more speculative lodes are avoided. There are also sufficient numbers of really good mines to be selected from such vast areas of virgin ground that the more uncertain speculative operations are neither requisite nor advisable.

In conclusion, I may say that the examinations should be made by men who have been qualified by especial experience in the peculiar formations of the minerals of this country, whose opinions may be corroborated by your confidential "home expert," when you deem it necessary, before the money is paid for the property. In working the mines it is better to first thoroughly explore the ground by shafts and levels, and, after sufficient proof has been given of profitable rock, to erect the appropriate reduction machinery. Too much haste to reduce into bullion has frequently ruined stockholders, because it failed to be present; and sometimes good mines have been suspended for want of money for exploration (which had been prematurely expended in mills, furnaces, &c.), just when they would, if continued, have given large profits.

San Francisco, May 2. J. S. PHILLIPS.

GOLD MINING IN COLORADO—No. VI.

SIR,—It will now be understood why the mining progress of Colorado has been so singularly impeded. The first operators, and afterwards the foreign companies, having been misled by the existence of the decomposed material overlying the vein matter (yet untouched by the disintegrating effects of moisture, air, and change of temperature), constructed expensive works of reduction to work that decomposed matter, and left those works, when they proved unprofitable, unaltered to cope with the virgin rock of the veins. These companies would not, and generally could not, re-construct. The question of a new treatment with proper machinery was left to time, to experiment, and entirely to the efforts of the people engaged in the work of mining. These, without capital, sought rather to make use of the plant already found inefficient than to undertake the erection of new works upon a plan devised for a proper treatment of the ores. Makeshifts, temporary expedients, partial remedies, and such improvements as were suited to the machinery in place, very naturally sufficed for those who had neither capital nor metallurgical experience to provide proper methods. As has been said, the erection of smelting works, in 1867, was the first step in the right direction, causing, as it did, a partial separation of the ores into smelting and into mill ore. This was only partial, because in the "mill ore" there was left disseminated, interspersed, associated with the gangue, fully 20 per cent. of precisely the same material as that selected out by hand for the smelting works. This mill ore was used to supply those abandoned or idle mills, and the loss continued, not so great but yet ruinous.

The idea of a separation was, however, established in practice, but it required time to do away with or to use up the old plant. Perhaps this would have been done some time since, had it not been for the influence acquired by a class of men whose interests had been fostered through education and the moderately profitable employment of the old constructions. For this reason the progress has been slow from an improper to a proper treatment or the ores—viz., a complete separation of all the mineralised matter from the gangue, to be followed by a chemical treatment of the mineral, and a mechanical treatment of the gangue, if the gangue still holds sufficient free gold to warrant any further handling.

The advent of the "Krom dry ore separator," in 1870, demonstrated the practicability of making this separation by a medium, and with machinery entirely suited to the physical peculiarities of the ores, the climate, and the district. A compact machine, employing air instead of water, and doing the work more efficiently than could be done by water, made it practicable to separate the ores where they were raised, regardless of the streams, mostly hard to reach inexpensively, and regardless of the severity of the climate, which for months renders a separation by water troublesome, irregular, and at times impracticable. You have had a description of these machines. Examples will now be given of separation, not of samples only, but of tons, embracing a variety of ores.

1.—Sample galena (sulphide of lead) content ..... 5·80 per cent.
Blende (sulphide of zinc) content ..... 23·28 „
Gangue, carbonate of lime, heavy spar.
Tailings, galena ..... 0·87 „
„ blende ..... 2·75 „
Loss in galena about 15 per cent., in blende about 11 per cent.

2.—Sheba ore, silver, Nevada.
Sample, 43 lbs., value per ton ..... $244·29
8¼ lbs. headings, value per ton ..... $1236·11
Tailings „ ..... 26·09
Loss in tailings not quite 11 per cent.

3.—De Soto ore, silver, Nevada.
Sample, 38 lbs., value per ton ..... 153·61
4 lbs. headings, value per ton ..... 1316·27
Tailings „ ..... 19·14
Loss in tailings not quite 13 per cent.

4.—Mammoth galena lode, Nevada.
Sample, 48 lbs., value per ton ..... 172·55
17½ lbs. headings, value per ton ..... 449·36
Tailings „ ..... 34·78
Loss in tailings a fraction over 12 per cent.

5.—Lexington mill tailings, Colorado.
Sample, 30 lbs., value per ton—gold ..... 6·20
Ditto ditto —silver ..... 4·81
9 7-10 lbs. headings, value per ton—gold ..... 25·83
Ditto ditto —silver ..... 10·85
Tailings, value per ton—gold ..... trace
Ditto ditto —silver ..... 1·76
Loss in silver a fraction over 35 per cent.

6.—Bates mill ore, Colorado.
Sample 100 lbs., value per ton—gold ..... 20·67
Ditto ditto —silver ..... 7·44
40 lbs. headings,
Tailings—gold ..... 2·58
Ditto —silver ..... 2·65
Loss in gold 12½ per cent., silver, 35 7-10.

7.—Various lots of Colorado mill ore separated by a full-sized working machine, without sizing the ore.

Sample, 23,000 lbs.,	value per ton	$27·00	
	Headings, per ton		$85·00
	Tailings		7·25
„ 3,025 lbs.,	value per ton	35·20	
	Headings, per ton		83·43
	Tailings		12·72
„ 5,600 lbs.,	value per ton	25·37	
	Headings, per ton		98·93
	Tailings		10·99
„ 5,540 lbs.,	value per ton	12·54	
	Headings, per ton		99·59
	Tailings		3·62
„ 6,651 lbs.,	value per ton	46·63	
	Headings, per ton		162·48
	Tailings		9·05
„ 6,210 lbs.,	value per ton	18·80	
	Headings, per ton		110·13
	Tailings		4·27

Quantity, 50,026 lbs., or 25 tons—average value of ore per ton $27·60; average of headings $106·41; of tailings $8·15.

There being no means for sizing the ore upon which these experiments were made, a second running of the tailings was undertaken in order to show the effect of preparing the ore properly.

Tailings assaying $13·72 gave tailings worth only ..... $2·86
„ „ 10·99 „ „ ..... 2·25
„ „ 3·62 „ „ ..... 2·28
„ „ 4·27 „ „ ..... 2·09
„ „ 9·05 „ „ ..... 3·23
Tailings averaging $8·32 per ton were reduced to $2·47 per ton.

8.—The Washington Mill Georgetown, Colorado.
423 tons treated, freed of moisture, 407½ tons ..... $54·22
When concentrated the machine tailings averaged $3·91 per ton.
Loss in tailings about 7½ per cent.

EXAMPLES OF LOSS BY WATER.

Kustel's work "On Concentration," published in 1868, was written for the American miner, and intended to supply him with the condensed results of European progress in this direction, employing water as the medium. Whatever statements this author has made relative to the percentage of loss in concentration by water can, therefore, be relied upon as not unfavourable to the system advocated, and may be quoted as a standard for comparison. He says: "In the concentration of lead ores, galena principally, conducted on the best principles with all the improvements of modern concentration in Europe, where great attention and plenty of time are devoted to the operation, the loss is generally from 15 to 20 per cent.—saving 80 per cent. of lead ores in concentration may be considered a very satisfactory result."

With regard to the silver ores, he continues: "It must be borne in mind, however, that galena occurs in cubes, the cleavage is also cubic, very seldem fibrous, the specific gravity is 7·5—most favourable conditions for concentration—while the specific gravity of the principal silver ores ranges from 5·2 to 6·2, and they have the disadvantage of assuming mostly a fibrous or leaf-like shape when pul-

versed. The silver sulphuret is heavier (7) but ductile. It is, therefore, quite proper to calculate on a loss of 35 to 45 per cent. in treating silver ores, provided the plan for concentration is the proper one." "With the concentration of gold the case is different; for its specific gravity allows a more perfect concentration, but although under the most favourable circumstances from 90 to 95 per cent. of the gold may be saved, there are also cases where 30 per cent. and more might be lost; for instance, if the gold should occur in a very fine scaly condition in a clayey rock."

Rittinger states the average loss at large of poor argentiferous ores in concentration by water, as follows:—

	60 to 70 per cent.
With slimes	40 "
With coarse sand	35 "
With middle fine sand	"

The best concentrating establishment on the Pacific Coast, in Nevada, gives the following sample report of work done in silver ores.

Value of ore before concentrating	$89·83 per ton.
After passing machine	43·22 "
After passing over 80 feet of blanket (tailings)	25·44 "
Headings	1010·20
A loss of 36½ per cent. of silver.	

In the practice of buddling, as followed in Colorado, the loss of gold and silver carried off by the water ranges between 40 and 60 per cent. At Morro Velho, Brazil, a loss of gold is sustained equal to 10 per cent. after a close amalgamation followed by a concentration of the impoverished sulphurets, conducted with very great care over a great length of strakes. These ores are worth about $8 per ton, and not heavily sulphuretted.

Contrasting the acknowledged loss by water separation with the above examples of separation by the "Krom dry ore separator," there can be no doubt of the great benefit to be derived from the use of this machine for separating the ores of Gilpin County.

Central City, May 15. B.

MINERAL HILL MINES.

SIR,—In the *Mining Journal* of April 27 you were good enough to insert a few remarks which I addressed to you as to this property. I have attentively read the report of Mr. John Taylor, jun., addressed to the directors, dated May 22, which has been circulated among the debenture holders. I do not see anything in that report calculated to alter the opinion I have formed as to this property. It was true that with reference to some of the mines the report appears discouraging, as sinkings have taken place through the limestone to various depths without meeting with any ore deposits, but these sinkings are comparatively shallow. In one mine—the Troy—Mr. Taylor refers to a streak of ore which has gone down about 20 ft., and upon which the men are employed sinking.

In the Chanarcillo Mine Mr. Sewell, in his letter to the Journal of April 20, refers to a sinking of nearly 280 ft. perpendicular through the limestone before reaching another deposit. This fact should afford satisfactory reasons for further careful explorations by some really experienced man acquainted with this stratification. Mr. Sewell writes from Salt Lake City, where he is at present residing—why should not his practical experience be brought to bear upon this most important property? The failure of the ore deposits at Mineral Hill is a great disappointment to all interested in mining; but, as I have said before, I cannot dismiss from my mind the fact that as the law is in the limestone stratification that Nature repeats itself, so I will firmly believe that use the means and Mineral Hill will yet prove a rich silver-producing property. PRACTICAL.

June 6.

REMARKS ON THE ORIGIN AND FORMATION OF MINERAL VEINS—No. V.

SIR,—In concluding my fourth communication on the origin and formation of metalliferous veins, which was published in the Supplement to the *Mining Journal* of March 9, I stated that two beautiful truths were recognised in the theory I had then been deducing—that of attributing the formation of metalliferous veins to "segregation"—but which were not otherwise made use of. They are, first, that metalliferous deposits do not occupy previously formed fissures in the rocks; and, second, that their minerals and mineralised contents are eliminated—extracted—from the country rocks. These propositions I further stated will be laid down in my next as facts which can constitute the only reliable basis upon which a theory consonent with reason and known facts can be can be constructed and maintained, &c. In pursuance of my purpose, as above expressed, I prepared and forwarded consecutively two papers on the subject, under dates of January 24 and 31, and which should have appeared if they duly reached you on March 16 and 23, after allowing for delays by the new blockade on the Union Pacific Railroad. I hope the missing papers may yet reach you, and meet with your approval. If they should not, however, I will, after waiting a sufficient time, prepare and send you copies, as near as I can, from the original outline which I have preserved, but exact copies I have not got. I deem it incumbent upon me to say as much as this, as many of your readers may have concluded that the omission arose from non-fulfillment of a publicly expressed intention.

I regret to see that several errors occur in my letter on "Theory and Practice, in their Application to Mining," published in the Supplement to the Journal of March 23. But I see no use in pointing them out, as so long a time must elapse between their occurrence and their correction. I know not whose the fault is, whether mine in not writing more plainly, or the printers from not paying sufficient attention to their duties. I can only say I will endeavour to write as plainly as I can when I next address you.

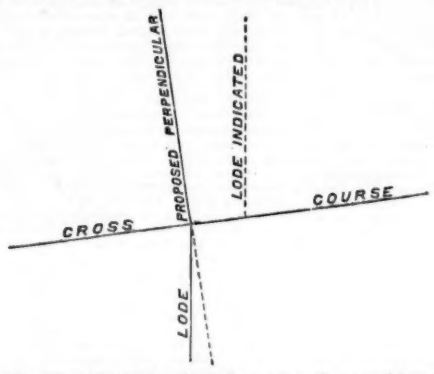
Ellsworth, Nye County, Nevada. ROBT. KNAPP.

PROFESSOR SMYTH'S LECTURES AT THE ROYAL SCHOOL OF MINES.

SIR,—In the Supplement to the Journal of March 30 "An Associate of the Royal School of Mines," in replying to my remarks on certain rules, as laid down by Mr. Smyth in Lecture VIII. of the present series, for finding lodes which may be lost in consequence of their displacement by cross-courses, has stated that I have both misquoted and misinterpreted the rules. And, further, that the Professor only gives one rule for such a purpose. This may, probably, mean that Nos. 1 and 2 are fanciful notions, and not intended as rules for the students' information and guidance. I should exceedingly regret to portray that amount of unfairness which would be manifest from misquoting any person's statements for effect, as I well know it could only at best be temporary, and the sequel would confer advantages on an opposing party in any controversy, which I should be decidedly unwilling to allow. To set myself right with your readers it will be necessary for me to give the rules as laid down by Mr. Smyth. If two veins, lode and cross-course, dip contrariwise—that is, if there is more than a right angle between their lines of dip as taken *down*—drive along the slide *on the side of the acute angle*.—2. If they dip together, or within a right angle, when the dip of the lode is flatter than that of the cross-course drive on the side of the acute angle.—3. If the cross-course is flatter than the lode, adopt the following general rule, depending on the direction of the dip of the former from the line of intersection of the two veins.—General Rule: Find the point where the cross-course is touched determine and lay down horizontally the line of intersection of the two planes, lode and cross-course. Then from the same point project horizontally before you the line of dip of the cross-course—or, in other words, draw a perpendicular to it in front of you. Remark on which side the line of intersection this perpendicular falls, and on that side begin and drive for the other portion of the lode. The foregoing is the correct rendering of the rules as laid down by Mr. Smyth in Lecture VIII., and published in the Supplement to the Journal of the 7th December, 1871.

It will now be proper for me to give my rendering—misquotation, as alleged—of these rules, as published in the Supplement to the Journal of March 23.—1. That where two veins, a lode and a cross-course, dip contrariwise—that is, when the dip of the two in descending from an obtuse angle, or, in other words, exceed a right angle between their lines of dip—the lode should be sought for along the side of the cross-course, towards the lesser angle.—2. When the lode and cross-course dip towards each other, and form less than a right angle between their lines of dip, then the lode should be also sought for on the side of the lower angle, It may be noticed here that I have used the term *lesser* angle instead of that of *acute* angle, but it will also be seen that a change of terms so simple and of so similar import does not in any way alter or vitiate the original meaning of any rule, problem, or paragraph. Rule 3, termed a general rule, says that if the cross-course is flatter than the lode, determine and lay down horizontally the line of intersection of the two planes, and from that of the cross-course at the point of its intersection draw a perpendicular line, and on which side of the point of the intersection that line falls—by being extended backwards, I presume—the lode is supposed to be indicated, and in that direction search for the lode should be made. This is the rule, I suppose, which I am said to have misrepresented. If I have done so nothing is easier than for "An Associate of the Royal School of Mines" to set me right, if he is able to do so. I will evade no point which might aid him in the so doing; on the contrary, I will afford him every opportunity to eorrect me if I am wrong. This is no mere matter of difference between myself and him, and Mr. Smyth is far too popular an authority to be allowed to propagate errors unchallenged, however unintentional, so dangerous and so misleading to mining as these so-called rules are, decorated though they may be in captivating scientific phraseology. Problems in geometry, nor any other specious substitute, can have but little to do with interpreting the hitherto inscrutable laws which regulate and control the displacement of metalliferous lodes by cross-courses, &c.

It will be necessary for me to illustrate by diagram my interpretation of the device somewhat pretentiously designated a "geometrical problem," as mere words may not suffice to convey my ideas as I wish them to be understood. And problems in geometry I purpose to leave to their legitimate uses, being fully convinced that that branch of science is one thing, and the phenomenon of the intersection and displacement of metalliferous veins by cross-courses is another and totally different thing, and that no geometrical problem can solve these enigmas, as the one before us will sufficiently indicate, as illustrated by the annexed diagram.



If this diagram illustrates the rule now under consideration, and its effects as an indicator properly—and, indeed, I see not how else to interpret the language by which it is expressed—the displacement of lodes must always be towards the greater angle, as shown above. But if it is otherwise, the point of the projected perpendicular line indicating the side on which the lode is to be found, instead of the dotted extension of the same line backwards, or towards the observer, then the displacement would as invariably be towards the left hand and the lesser angle, instead of, as shown in the diagram, to the right hand, and to the greater angle. Need I add that the observance or such a rule in practice would invariably lead to one conclusion, according as the indicating perpendicular line is construed—either all the displacements of lodes would be to the greater angle, as shown above, or they would be found with equal constancy on the other side. There could not be any variation from such a result by the observance of such a rule. Its action would invariably be with mathematical precision; and no doubt could thenceforth be reasonably entertained regarding the direction of displacement of any lodes, excepting those whose intersection was effected at absolutely right angles with the intersecting vein, dykes, &c.

I stated in my former communication on this subject that these rules were "specious" and "pretentious," and I still think, as I then thought, that those terms were sufficiently temperate to characterise them by. And I now add that I have not the slightest conception how they can possibly be the result of scientific induction. The sort of explanation afforded, of "the hanging wall having slid down on the foot wall," to determine in which direction a displaced lode is to be found, is a little too subtle and refined for my obtuse intellect, and, therefore, I require a more tangible and detailed description of such occurrences.

I have, so far as my judgment will enable me to decide, stated my views of the case with candour and fairness, and have illustrated by diagram my interpretation of the principal rule, as laid down by Mr. Smyth; and if I am wrong in my interpretation of the rule, there can remain to it but a single alternative, and to that the same fatal objections will apply; and, therefore, the rule as a guide to the miner, would be worse than useless. If the accompanying diagram does not illustrate correctly the principle and purpose of the devise, it will devolve as a duty on an "Associate of the Royal School of Mines" to furnish one illustration of the object and action of that *simple* contrivance. ROBT. KNAPP.

Ellsworth, Nye County, Nevada.

AN OUTLINE OF GENERAL FACTS RELATIVE TO CORNWALL, CORNISH MINING, &c.—No. II.

SIR,—Cornwall is very remarkable for the great plenty of copper and tin mines, in which last respect it is famed above all the other parts of the world. The present returns of tin from Cornish tin mines are equal to 1800 tons, or at the rate of nearly 2,000,000*l.* per annum.

The inhabitants also merit some remarks. With regard to them, I find in an old MS. in my possession they are thus described:—"We shall do ourselves no small credit to observe that our ancestors, the Britons, must have been a worthy and brave people, if we may judge of them by the genuine remains in the county of Cornwall, for, without prepossession of flattery, we must say that we observed such a primitive plainness and simplicity of manner, such singleness of heart and sincerity of intention as we could not but admire and regard almost as a novelty—those people appearing so absolutely unacquainted with, or ignorant of, fraud and imposition, dissimulation, and flattery as if they had never heard of such a thing; and if to this we add a free, facetious, and generous temper, a curious and inquisitive disposition, we shall not then have finished the character which they justly merit, till we have, moreover, mentioned their natural philanthropy or humanity and unparalleled hospitality to strangers—this every one must be a witness of who has been among them and must readily confess if he does them justice. In genius the Cornish people are nothing inferior to the modern English, being great encouragers of arts and sciences in general, and (as we found by experience) particularly delighted with the studies of philosophy, which we presume will be allowed a very good proof of a delicate and polite taste; and as we never but once saw an eclipse calculated by a lady, we ought not to omit mentioning that she was of this county. As to mechanic arts, no one will wonder if we say they excel in them, not only their genius but their business give them a particuliar bias to such kind of studies and inventions; and, in the last place, what regards their commercial and mercantile character is well known to all the world, without our mentioning anything particular on that head, We shall say no more, nor could we say less, as it reflects great honour upon the English nation in general to see the offspring of our ancient stock appear in so good a light. The language of the Cornish gentry and yeomanry is English, and as pure as in London, unless it be in two or three parishes near the Land's End, where a corrupt dialect of the ancient Cornish tongue is much used." This was written in the year 1700.

The Cornish people are certainly very remarkable for their perseverance and daring determination, of which the following is a specimen:—This was the Wherry Tin Mine, near Penzance, and is, perhaps, the most notable instance of submarine mining ever attempted, and required great daring. It was one in which the vein of worked ore was not only under the bed of the sea, but the shaft was actually sunk in the sea itself. Dr. Davy, in his "Life of Sir Humphry Davy" (Davy lamp for lighting the miner without risk from the explosion of fire-damp was invented by Sir Humphry Davy in 1816), after describing the circumstances under which the philosopher became acquainted with Mr. G. Watt (son of James Watt, the great engineer), at Penzance, describing the rambles which they took together, goes on to say:—"The Wherry Mine, the shaft of which was in the sea, approached by a long wooden bridge, and the workings of which were entirely under the sea, at the short distance of about a mile from Penzance, was a favourite place of resort with them. It affords an unusual variety of minerals, and, from its peculiarities, could not fail to excite a deep interest in their minds, as a struggle of art against Nature, in which a victory was gained over the elements by means of the most wonderful invention of the age—the steam-engine, which only a short time before had been perfected by his distinguished father, the elder Mr. Watt, and this very engine, erected on the shore, acting at a distance over the surface of the sea, and drawing up water from beneath its bed." Mr. John Hawkins, in a paper in one of the early volumes of the Cornwall Geological Society's "Transactions," gives a very interesting account of the origin and construction of this mine. The first attempts to work it were made about the beginning of the last century, when numerous small veins or branches of tin being observed to traverse a rocky shoal which became exposed to view at low water, some persons were induced to make it an object of mining adventure. How long they persevered in the enterprise, and what the mechanical aids of which they availed themselves, are not known, but it is evident the works, after being sunk to the depth of a few feet in the rock, were finally abandoned.

In the year 1779, Thomas Curtis, a poor miner of Penzance, had the confidence to renew the attempt, with a capital, it is said, of only 10*l.* at his command. When it is remembered that the distance of the shoal of rocks from the beach at high water is about 720 ft., and that this, in consequence of the flatness of the beach, is not much lessened at low water, the nature of the difficulties with which he had to contend may be judged. It is calculated that the surface of the rocks are covered about ten months in twelve, and the depth of water on it at spring-tide is 19 feet. The prevailing winds occasion a very great surf, even in summer; but in winter the sea bursts over the rocks in such a manner as to render all attempts to carry on mining operations unavailing. At such a spot did Curtis proceed to mine in such a shaft, and, as the work could be proceeded with only in summer or during the short period of time when the rocks appeared above water (a period much shortened by the necessity of previously emptying the excavation), three summers were actually consumed in sinking this shaft a few fathoms. The use of machinery then became practicable, and a frame of boards is said to have been applied to the mouth of the shaft, which was cemented to the rock by pitch and oakum, made water-tight in the same way, was carried up to a sufficient height above the highest spring tide. To support this boarded turret, which was 20 ft. high above the rock and 25 in. square, against the violence of the surge, eight stout bars of iron were applied in an inclined direction, four of them below and four of extraordinary length and thickness above. A platform of boards was then lashed around the top of the turret supported by four poles, which were firmly connected with these rods, and upon this platform was fixed a windlass for four men. In 1792, Mr. Davies Gilbert, writing to Mr. Hawkins respecting this singular mine, said: "The course of stanniferous porphyry near Penzance (the Wherry) promises to make a great mine. There are indications of tin being contained to a great extent in both directions, and the bottoms are growing longer and remain rich. A house near the green, built with fragments of this stone, which were probably picked up on the shore, or broken from the top of the rocks, is, I hear, to be pulled down and rebuilt with other stone for the sake of its tin." Curtis, as has been before stated, commenced this daring undertaking with the support only of his own few friends, but it seems he was soon joined by others, who brought money into the enterprise; and it is stated that Curtis never from the first entertained any doubt as to the ultimate success of his attempt. Thence did this most singular mine continue to be worked till it had yielded more than 70,000*l.* profits, when a period was put to its useful existence, almost as remarkable as the circumstances connected with its origin. An American vessel broke from its anchorage in the bay known as Gwavas Lake, near Penzance, and striking against the stage constructed out in the sea, on the shoal of rock, demolished it together with the machinery, filled the mine with water, and thus put an end to the adventure. J. HARRIS-JAMES, Civil and Mining Engineer.

Grampound-road, Cornwall, June.

WHAT TO SELECT—WHAT TO AVOID—No. XXII.

SIR,—The writer at the beginning of the letter which appeared in last week's Journal stated that, although the value of copper had responded to the views expressed last autumn, and although it had reached a price that the most sanguine could scarcely have anticipated, yet, looking at its statistical position, the limited supplies, the comparatively exhausted condition of the Indian market (which has still to be supplied), there can be no doubt that copper will not only maintain its commercial financial position, but will command a considerably higher value, In the postscript attached to that letter the writer was able to announce an advance of 5*l.* per ton, and on Tuesday last another advance of a similar amount was officially declared. Judging by private advices, the Indian market is at length evincing an anxiety for supplies, and is absorbing stocks at the current advanced values, so that higher quotations may yet be expected.

PARYS MOUNTAIN.—This mountain, situated in the Isle of Anglesey, has been celebrated for its production of copper from the Roman era, vestages of their operations being often found in the locality. From that time till 1764 the mines would appear to have been entirely neglected; some copper was then discovered accidentally, when various explorations were made without success. The then proprietors were about to abandon the undertaking, when their agent made a final attempt in another part of the mountain, and discovered within two yards of the surface the enormous veins of almost pure copper, which yielded such fabulous profits for so many years. As this mine is now so prominent, it may not be without interest to quote its description, as penned by a well-known ancient writer. "Having ascended to the top of the celebrated Parys Mountain, I stood upon the verge of a vast and tremendous chasm. I stepped upon one of the stages suspended over the edge of the 'steep,' and the prospect was dreadful. The number of caverns at different heights, the broken and irregular masses of rock, which everywhere presented themselves, the hundreds of men at work in different parts, apparently in the most perilous situations, the motion of the windlasses, and the raising and lowering of the buckets to draw out the ore, the noise of the pick upon the ore, the hammering of the wadding when it was about to be blasted, with at intervals the roar of explosions in distant parts of the mine, altogether excited the most sublime ideas, intermixed with sensations of terror. Leaving this situation, and following the road which leads into the mine, my astonishment was again excited the moment I entered; the shagged arches, the overhanging rocks, which seemed to threaten annihilation to anyone daring only to approach them, when superadded to the sulphurous smell arising from the kilns in which the ore is roasted, made it seem to me like the vestibule of Tartarus, described by Virgil; but looking up from this situation, and observing the people upon the stages 150 ft. above one's head, and seeing the immense number of ropes and buckets, most of them in motion, and to reflect that a single stone, casually thrown from above, or falling from a bucket, might in a moment destroy a fellow-creature, a man must have a strong mind not to feel impressed with many unpleasant sensations, The sides of this dreadful hollow are mostly perpendicular—along the edges are the stages with the whimsies, by which the buckets are lowered, and from which the men descend to their stations upon the sides. Here suspended the workman picks with an iron instrument a place for a footing, whence he

cuts out the ore, and tumbles it to the bottom, where it falls with a tremendous crash. After working the place into a cavern he removes to a new station."

By means of these open excavations enormous amounts of ore have been removed, being worked to a depth below which it was impossible to reach by that system of mining, hence one of the most important points in the present explorations is that which is to come under this enormous deposit, where there is every reason to believe it will prove as productive as it did to the lowest point attained in the "open cast." There are several other important points, all of which tend to make this mine (especially in the present condition of the copper market) one of no ordinary merit. The writer hopes in a future letter to give some further details relative to this extraordinary deposit of copper.

NEW WHEAL LOVELL.—This mine continues to open out in a most satisfactory manner. The returns are about 8 tons of tin per month, leaving a profit of nearly 300*l.*, after paying the cost incurred in the vigorous development of the mine.

NORTH TRELEIGH WOOD.—On behalf of large shareholders this mine has been re-inspected by two well-known Cornish agents, who have more than verified the opinions expressed by the inspecting agents who reported upon the mine a short time since. Returns of tin and copper will be made as soon as the machinery is in operation. The quality of the tin far exceeds the average of the county, and realised, when last worked, a far higher price than the produce of any of the mines in the locality. The mine is to be again inspected in a few days, on behalf of an influential mining capitalist, who entertains a very sanguine opinion as to the results of the copper developments.

AMERICAN MINES.—The comparative depression in the market value of shares in some of the leading American mines—such as Flagstaff, Camp Floyd, and Richmond Consolidated—affords a favourable opportunity to investors to acquire an interest in these valuable mines, upon terms which must prove remunerative,

Pinner's Hall, Old Broad-street. FREDK. WM. MANSELL.

NOVEL STAMPING ARRANGEMENTS.

SIR,—The publication of the experience of practical miners being calculated to promote the advancement of the mining interest, Cornishmen ought to feel much indebted to Mr. Nicholas Ennor for the pains he has taken in devising a system of lifting stamps, which enables him to promise that the appurtenances for a given number of heads may be erected at one-third the first cost at present found necessary; but I fear that when he proceeds to get a battery of stamps in operation he will find not only that the first cost is greater than at present, but that, owing to the greatly increased friction which there would be with his arrangement, the increased cost of working would be enormous. Considered as an improvement upon existing Cornish stamps, Mr. Ennor's invention is mechanically wrong, and, therefore, cannot be practically right, and to a man of Mr. Ennor's long practical experience this can be easily proved. He cannot do a given amount of work with less power, and, as a mechanic, I venture to add that he cannot do it without much more power. I will explain to him the reason.

In stamping with the Cornish stamps, which I admit to be the most economic system of stamping, the work is done by the free fall of the stamps head upon the ore to be stamped, and if the same head be used it will follow that the higher the fall the greater will be the stamping power. Stating it in another way, a head weighing 1 cwt., and falling 18 in., will do the same work, whether it is lifted by the old system or by Mr. Ennor's system. In stamping the power is consumed in lifting the heads, and not in crushing the ore. This being so, we need only consider the most economic mode of lifting the stamps. Now, if a given quantity of power be required to lift the head when the ordinary stamps-axle and lifter are employed; we shall, with Mr. Ennor's system, require not only the same power, but as much more as will overcome the friction at the fulcra of his levers as well as at the points where the levers and stamps-rods are connected together. The friction between the tails of the levers and the axle-tappets is the same as between the cam and the lifter in the ordinary stamps. The levers give no additional power; for the most levers can do is to transmit power, and if Mr. Ennor so places the heads on the levers that the tails are more easily moved by the axle-tappets than usual, he must do one of two things; he must either shorten the fall of the stamps-head or make the head of the stamp of less weight. In a model it is frequently difficult to discern the defects which can be seen at once in the machine of working size; but in this case it is only necessary to look at the machine to see that the loss of power will be enormous. As Mr. Ennor refers to Blake's stone-breaker, I may just mention that the greatest improvement introduced since it first became known to British miners was that made by Mr. H. R. Marsden, of Leeds, who dispensed with the lever, and worked his toggles direct from the cam shaft, as in the old Cornish stamps.—*London, June 3.* A. SCHMIDT.

ROSE UNITED MINES—No. I.

SIR,—I like to foster all worthy and legitimate undertakings, and, therefore, in this letter I transcribe the account given me by John Gribbin, of Mount Hawke, who was a pitman in Great North Downs at the time of its abandonment, and for six years previously. The following is his statement:—

"The rich stope of tin between King's shaft and Sleggan's engine-shaft will pay the whole cost of working the mine. At the back of the 90, east of Sleggan's shaft, the lode has been cut into 15 or 16 ft., but not wholly cut through. This is the main lode, which underlies southward, and unites at the bottom of the 100 with another lode, on which little has been done, except driving about 15 ft. into the southern side of it, leaving the northern part entire. At the 90, on the main lode, near Butler's shaft, and about 70 or 80 fms. west of Sleggan's, the copper ore is so abundant and so easily broken that four men could keep a skip going 12 hours a day. The lode here is worth 50*l.* per fathom, at the present price of copper, and the cost of driving about 50*s.* or 60*s.* per fathom only. At the 80 a driving of 10 or 15 fms. westward would hole to Butler's shaft. At the 90 about 85 fms. driving would reach the same shaft. These communications would facilitate operations on the lode. At the 90 end west the tinstone from the southern side of the lode could now be sold for 40*s.* per ton; lode varying from 2 to 4 ft. in width. In the bottom of Sleggan's shaft, which is down to the 100, there are great rocks of wolfram (called by the miners the "mother of tin"), about 6 or 7 cwts. There is a cross-cut at 20 fathoms west of Sleggan's shaft driven southward at the 80 about 12 or 15 fathoms towards South Wheal Hawke lode, on which the miners made noble wages on tribute. This is Halenbeagle lode, on which a 70-in. engine was placed in that mine. There is at Butler's another cross-cut driven southward about 12 or 14 fms., passing through a copper lode, on which little has been done. At about the 120 this lode will be found to join the main lode. The prosecution of this cross-cut will intersect the Wheal Peevor great tin lode and several parallel copper lodes.—JOHN GRIBBIN."

The circumstances which operated against the last company, and led to the abandonment of the mine, no longer exist, so that the present company may go on with the assurance of success. R. S.

Truro, May 30.

MINING IN ROCHE—NORTH BONNEY.

SIR,—It is pleasing to have to chronicle the success of our friends, especially when we plainly see that such is also co-existent with the dawn of prosperity in the locality near which they reside, and which until but recently suffered under a state of semi-Cimmerian darkness as regards speculation and trade in general. When from the atmosphere of dubity which, unfortunately, surrounds our Cornish mines we find some which by the energy of those connected with them, combined with strict integrity of purpose, are enabled to show the world the means by which to arrive at success, and prove such by their own, I have always satisfaction in being present at any reunion to celebrate their well-earned prosperity. On one of these occasions it was my lot to be present on Saturday, May 25. It was at North Bonney, a mine situate in the now bustling district of Roche, and standing, as regards the altitude of ground, amongst the highest in the neighbourhood.

Not being personally acquainted with many who were present, I trust they will excuse me if by inadvertence I should misname any of those who contributed so much to the general happiness of the day. On arriving at the mine, I observed a large shed fitted up for the time with tables, &c., which furnished good grounds for the belief that there would be no lack of good old English fare on the occasion. This belief was soon to be verified by the dinner, at which Mr. J. A. Alexander, one of the directors, ably presided, and was supported by Mr. T. B. Smily, B.A. After the cloth had been removed, and the usual loyal toasts duly and vociferously drunk, the Chairman proceeded to those more particularly associated with the day. To the toasts of the "Land, Mining, and Commercial Interests," Mr. Nicholls for the land, Mr. Marshall for the commercial, and Captain R. Martyn for the mining interest, responded. "Success to North Bonney" was then the order of the day, and if the manner in which this was received is any criterion of the future well-being of the mine, I can only say that I, for one, envy the fortunate possessors of shares of meat. The health of the Chairman closed the dinner, who, in responding, said that all the directors required of all who were connected with the mine was a fair day's work, for which they were fully prepared to pay a fair day's wage. He said that in deliberating as to whether or not the directors should risk such large sums of money as they had, they were to a great extent led to their present determination by the good accounts of the known probity of Capt. D. Cock, who they were fully persuaded would not have introduced anything to them in which he himself had not firm faith. The visitors then amused themselves by viewing the machinery of the mine and examining the floors, where the operation of tin-dressing was explained to them by Mr. R. Payne, the courteous dresser of the mine. Then came tea, and after that running matches for the men, which owing to the incqualities of the ground afforded much amusement. A band of music being on the ground, the men, headed by it, then proceeded to the village of Roche, and seemed from afar to be a lengthy column. Altogether, I have seldom seen a gathering of this description which gave me more satisfaction, and as I slowly rode home cogitating it occurred to me—might not others go and do likewise.

HENSBORO BEACON.

NORTH BONNEY MINE.

SIR,—This mine is situated on the well-known hill called Hensbarrow, which is 1034 ft. above sea level. From its elevation, the surface is open to all the winds that blow, but the manager will provide all necessary protection for the labourers against the weather's inclemency. The mine is bounded on the southern side by Wheal Bonney, now called Shelton; north by Hensbarrow, a sett recently taken in hand by Capt. D. Cock, the manager of this mine; and on the east by the celebrated Wheal Beam, which yielded large profits to Messrs. Williams and others many years ago. North Bonney is a very remarkable piece of mineral ground, because of the extent of surface workings by the ancients. I estimate that an area of about 100 acres has been broken up, and now covered by pits and rubbish, manifesting the industry and perseverance of the "old men" in searching after tin, with which the hill abounds. They followed the tin, apparently, so far as the water would permit, as the large excavations in several places clearly show. The present company was formed about 12 months ago, in Manchester, and consists of gentlemen of great respectability. Since then a rotary-engine of 30 in. cylinder for pumping and stamping has been erected, and is at work. Since that erection, and within the space of five weeks, they have sold 3 tons of black tin, chiefly from the halvans thrown away by the old workers, which yields 5 lbs. of tin per ton of stuff, one-half of which is profit. It is conveyed by tram-wagons direct to the stamps at an expense of only 3*s.* per ton. There are now 24 stamp-heads at work, and 24 more are about to be added; when those are applied the returns will leave a good balance of profit monthly. All needful additional appliances for dressing the pulvered tinstuff are in process of preparation, the company having a large subscribed capital for carrying on the operations on a liberal scale. The engine-shaft is only 20 fms. from surface. There is no adit. At that depth a cross-cut has been made southward 20 fms., which has intersected four lodes, all of a northerly inclination except one. They expect to cut another lode within a few feet further on. If this cross-cut be extended northward, as I suppose it will be, I have no doubt that a dozen, or 20, or more lodes will be discovered. The works at surface seem to indicate that the hill is full of lodes. The lodes already cut yield tin of good quality. The water is so little in the mine that, for dressing purposes, it is "repeated"—*i.e.*, pumped up continually after passing through the dressing-floors, and used in the dressing processes. A lode cut a few days ago has let down additional water. The rock, or "country," is granite. The mineral owners are Messrs. Ivimy and Gill; the manager is Capt. David Cock, of Roche, who is also the manager of the several mines constituting the "Roche and St. Austell Consols." The purser is Mr. Wm. Wade, of Plymouth, and the secretary is Mr. C. H. Wade, of Manchester.

Saturday, May 25, was a high day at North Bonney, as it was set apart for the purpose of celebratiug the inauguration of the works, the putting the engine to work, &c. Several of the directors, with all the officials, were at the mine. A half holiday was given to all the workpeople, and a dinner for about 200 men, women, and children was provided by the company, and served up on three long tables in the timber-house, with abundance of ginger beer, shrub, and peppermint, instead of the alcoholic beverages commonly drunk on similar occasions. In the evening tea was served up to all those who preferred it to bread and cheese, ginger beer, &c., of which some partook instead. The evening was spent in great harmony, several appropriate speeches were made, and the company separated highly pleased with the entertainment; and, I need not say, in sobriety, at least so far as liquids were concerned. It is probable that the Roche district, which is highly stanniferous, will receive that attention from miners of which it is well worthy. There are several mines in that parish and St. Austell, but none deep, except the Beam Mine, and that is only 120 fms. from surface, which in modern mining is not called deep. Cornubia, Beam, and Hallew, are contiguous. These comprise "the Roche and St. Austell Mines (Limited)," which are to be worked effectually forthwith; in fact, the works are in progress. Of these mines I purpose to send you particulars in my next.—*Truro, June 5.* R. SYMONS.

LEAD MINING IN SHROPSHIRE.

SIR,—In reference to an article which appeared in the Journal of May 18, headed "Lead Mining in Shropshire," and containing some remarks from Mr. Tahourdin, relative to the depth of the Bog Mine, wherein the writer infers that the mine is 230 fms. deep, only 100 of which are cleared, I am instructed to inform you that the mine is 148 fms. deep from Boat level, which is 54 fms. from surface, thus giving a total depth of 202 fms., of which 154 are drained—that is, the shaft is clear for 100 fms. below the Boat level, leaving but 48 fms. yet to drain. This is being rapidly accomplished, the capital in hand being considered amply sufficient for all purposes; added to the fact that as we open the mine more stoping can be carried on, as there is a quantity of ore left standing by the old workers.

Austinfriars, London, May 31. W. J. LAVINGTON, Sec.

EAST LLANGYNOG MINE.

SIR,—I am induced to ask a space in your valuable Journal in self justification and defence, and to correct misstatements made in the Supplement to the Journal of May 25 in reference to the above mine. All I want is a fair field, and trust to you, Sir, for an opportunity of answering the charges made. As I have not sought this controversy, I have only to say that I may be compelled to state still more unpalatable facts if attacked without cause by Capt. Burn respecting this mine, or my management since I have been here, so that the shareholders and public may not be misled by thinking that I dare not answer the charges made by him, and to assure him that such remarks and untruths are not worthy of the least notice by anyone interested. The old adage that "Those who live in glass houses should not throw stones" is peculiarly applicable here, for a man who could not keep a good situation through neglect of duty is not worthy the confidence of his employers; and as he has called my ability in question, I must return the compliment, and analyse his skill. I have many proofs that will convince any practical miner of his inability to manage a mine. I will take the subjects in the order in which they stand in his letter.

First, then, let me beg to refer to three or four statements made by your correspondent, on May 22. He says he dressed and sold 40 tons of ore. Let me ask how long he was in getting those 40 tons? Simply because he wants the credit of developing the mine. I should say he was occupied about two years, and it sold at 10*l.* 2*s.* per ton, the ore not being properly dressed. I have no doubt it cost one-half its value to get it over the mountain from No. 1 and dress it. It had to be shovelled about half a dozen times before it reached the incline, and was put into the wagon; and if it should fortunately reach the bottom (on account of the irregularities of the road), it had to be shovelled out again there, often three or four wagons a-day capsizing going down. Two of the present directors, previous to this company being formed, came to see the mine (about November, 1870), and your correspondent stated he had 70 tons of lead ore broken, so it may be seen that he worked until the following May, and the 70 tons proved to be only 40. So much for judgment in estimating. Taking this into consideration, I am rather surprised that he judged the quantity of ore in August last to be so little. It is true we had a small quantity of solid ore, and the spalled and picked work (called 100 tons). Surely he must have included the rocks sent down the incline to fetch the timber up in the wagons. We also added to this pile from August, 1871, to January, 1872. Our work was superior to his in quality, and in February last, after we crushed the ore and dressed it, we sold 34 tons. The hutch work he speaks of is at No. 1 still, and I will freely give it him if he will take it down.

This will give your readers some idea of the quality and quantity of the spalled and picked work. Your correspondent also says the plans for the development of the mine are his own. I ask him candidly, what has he done in the mine? He simply cleared the old levels which were driven by previous companies, and never saw the end or forebreast of either level in No. 4, with the exception of the middle lode, where he did next to nothing; he also cleared the No. 1 level on the south lode, where he fortunately found the lode from which his 100 tons of spalled and picked work was raised; and at the first meeting of the present company, about March, 1871, he stated that he had hundreds of tons of ore discovered in No. 1 level. So you see that up to August following he had got from all sources the quantity estimated of the 27 tons mentioned, which possibly turned out about one-half. The No. 2 level on the south lode is extended west from the side of the mountain beyond the No. 1 cross-cut from 10 to 15 fms.; had he continued to sink the old men's sump below No. 1 and communicated with No. 2 it would have ventilated the mine and let all the water down, instead of which he drove off a level at 8 fms. deep, which necessitated the drawing of stuff and water, and also a machine to blow air. We now go on to No. 2 winze, 60 fms. further west. At that point he sunk it down about 12 fms., and commenced a level 11 fms. deep below No. 1. There he fixed a hand-pump, with six men, at 18*s.* per week per man, to pump and draw the stuff. This pumping was continued till the 11 was driven about 16 fms. west, costing in the aggregate hundreds of pounds. He also commenced to drive east from this winze at 7 fms. deep. This great miner then commenced to bore a hole to let the water down to the No. 4 level, by 15 men, five men in each shift. After seven or eight weeks this boring was abandoned, and driving resumed in the 11, when they had air. I also state that I put the question to Capt. Burn as to the distance to be bored. He said about 8 fms., and when we communicated the levels it proved to be 20 fms.

I will allow your readers to judge if this is not a man of great mining skill and experience; and what is most amusing to me he went in, and sometimes sent into, No. 4 level, to hearken to the boring, when the lode was 13 fms. short of being down as deep as the level, and end as far as it was cleared, 30 fms. short of being under the winze. This, again, shows a great want of judgement. Again, your correspondent says that Mr. Thomas, of Llanidloes, erected the machinery. This I deny. We had the castings from him certainly, but Mr. Thomas has not seen either the mine or machinery since we had the castings from him: he was here with Captain Burn before we had them, but I never spoke to him at that time. In reference to the lode in No. 4, at the time of the meeting it was not cut through; I am happy to say it is now producing fine stones of ore. Does he want credit for driving a cross-cut south to cut the lode when it is 5 fms. north of the level? If so, he can take it. In reference to the level 9 ft. above No. 1 he speaks of, I put up a rise through a dead piece of ground to make a trial, and fortunately cut a splendid rib of ore 9 ft. above the level; this stope has turned out at least 60 tons of ore. Does he want credit for this too? As a winze had been sunk by your correspondent only 3 fms. east of the one with the pump, the hanging side of the level was cut out to make a plat, consequently the back was very heavy, so it was thought advisable to undercut the rib of lead 9 ft. above the level, and thus save timber and stoping away dead ground, which did not cost 6*l.* 10*s.*, as he states, but only 60*s.* per fathom, 5*s.* more than he supposed the stoping price. Again, in reference to the deep adit, it was stated in the report that if it should be cut rich the probability would be of returning 200 tons per month. Capt. Burn drove the deep adit cross-cut about 40 fms. south at 5*l.* 10*s.* or 6*l.* per fathom, after he had cut the lode, did book on the mine. His son, the storekeeper, also without a book on the mine. As this is my first communication I trust you will give it in full, as the only means of satisfying the shareholders, or anyone interested, of the merits or demerits of myself or my accuser.—*East Llangynog Mine, June 3.* EDWARD PASCOE.

EAST LLANGYNOG MINE.

SIR,—I have read the letters of Mr. Taylor in the Supplement to last week's Journal, and not being behind the scenes am unable to judge of the statements therein made. It is certain, however, that we ought to have true information from the mine published in your Mining Correspondence, as is the case with other mines with which I am connected, and I contend that the directors are not doing their duty to the shareholders in withholding from them that to which they are entitled. With respect to the meeting held at Manchester, at which I had intended to be present, I assert it was held at a very inconvenient hour, half-past 10 o'clock, which was an injustice to shareholders living at a distance, and it was impossible situated as I am, to reach Manchester in time for the meeting. I think the directors should show a little more respectful feeling towards the shareholders generally by letting them know periodically, through the medium of the Journal, the state and condition of their property. A SHAREHOLDER.

BROOK WOOD CONSOLS.

SIR,—After struggling hard against the stream for the last nine years this mine is about to be set to work by Mr. F. S. Thomas, of London; and his solicitor, Mr. W. A. Day, Palmerston-buildings, is instructed to obtain the three leases for 21 years from Sir Bouchre Wrey, Bart., Earl Macclesfield, and Capt. T. Trevillion, manager of the Brook Wood Mine. The amalgamated setts will consist of East Brook Wood Copper Mine, where a shaft has been sunk 20 fms., and lode cut producing rich yellow copper ore; but just as the lode was cut dissention among the shareholders was caused by a few only paying their calls, the mine being commenced without any paid-up capital. The lode when cut in the 10 was valued at 20*l.* per fathom with the standard at 85*l.* This mine was reported on highly favourably by the late Capt. C. Thomas, Mr. George Henwood, the late Capt. J. Nicholls, Capt. Sleeman, and Capt. Thomas Bennett, of Wheal Emma, joining at the west. A long adit has been driven into East Brook Wood, and three lodes cut producing beautiful yellow copper ore. Those three lodes run through Earl Macclesfield's mineral right, and through Mr. Trevillion's, where adits have been driven, shafts sunk, and yellow, peacock, and grey ore have been found, to the north-west in the same setts. The Old Runnyford Combe Tin Mine lodes run through, shode pits have been put down, and mundic found that will produce a good van of tin.

The advantage of these setts to be worked by one company is derived from the abrupt nature of the ground where the adits are driven in, and the backs of the lodes are gained, and a never-failing stream of water runs through the setts after leaving a flour mill, and had the above owners' land been worked separately it is very likely disputes would have arisen, both on account of water and private roads that pass through the setts. With abundance of timber, and the branch of the South Devon Railway working near the mine, and the improvement in the price of copper and tin, with silver that gave by Mr. Jenkins's assay, I think, 17 ozs. to the ton of ore, certainly with the prospects that I have mentioned, using the old motto, "Sink another lift," would be *apropos* to Brook Wood Consols. GEORGE SPARKE.

Ashburton, June 4.

WHEAL AGAR—TERRAS.

SIR,—I regret to see Mr. Rogers mixed up with the promoters of Terras in a dispute as to the value of the ore in the latter mine; and, as a shareholder in Agar, would much rather see him reporting progress to his own adventurers, who never see a line in the Journal from one quarter to another as to the state of the mine. Could he not send a general outline of all that has been done and discovered in Agar within the past ten years? And if, as he says, dividends could have been paid long ago, perhaps he could tell us how many more calls he may still require for there may be a limit even to the patience of— JUN.

MOUNT DALBY MINING COMPANY.

SIR,—My letter of May 22 was written as mildly as possible, in the hope that persons who had issued the prospectus and plan complained of would either have to make as satisfactory an explanation and *amende* as the circumstances would permit, or else deny my impeachment of their conduct, and thereby force me to make such further explanations as would place the whole facts before the public in their force. Was my personal interest only at stake in this matter I certainly would be disinclined to pursue it further, especially as by their silence that portion of the public who may reasonably be supposed to stand most affected appear to take no interest in the truth or otherwise of our complaint; but as letters have appeared upon several occasions in the *Isle of Man Times* containing what may fairly be termed serious allegations against some of those concerned, and I have received a long letter from a writer totally unknown to me, who signs himself "Manx Miner," professing to give from his own knowledge minute details of circumstances stated to have taken place in Manchester about two years ago, and which, he says, were recorded in the columns devoted to reports of the law-courts in June and August, 1870, urging me upon the strongest possible grounds to give the public the benefit of what he very strongly stigmatises, that I feel impelled to give those concerned another chance of putting themselves right if they can. WM. C. FOX.

Dale-street, Liverpool.

WHEAL DANIEL, AND ITS MANAGEMENT.

SIR,—If "B. D." whose letter respecting the management of Wheal Daniel appeared in last week's Journal, will favour me with his name and address I shall be most happy to answer his letter, and will undertake to prove his statements be wholly incorrect, and entirely misrepresenting the true state of affairs. It appears to me that if he really has the interest of the mine at heart, which he professes to have, he would have shown much better taste had he waited until the general meeting of the adventurers, which will be held on the mine on Tuesday next, when he would have every opportunity of unburdening his grievances to the shareholders.—*Chacewater, June 4.* THOS. GOOCH, Manager.

SOUTH WHEAL FRANCES.

SIR,—A circular has been issued by the Chairman of the South Wheal Frances Committee in reply to the very admirable letter addressed by Mr. Thomas to the shareholders some little time since, but without, in my opinion, touching the point at issue at all.

The Chairman and his colleagues certainly take great credit to themselves for having brought to a successful termination one of the most vexatious lawsuits ever pursued in the Courts of Law." But I would ask, What have they gained by the 12 years' lawsuit? I cannot estimate the value at one farthing. Reverse the picture, and let us see what the poor shareholders have lost. Why, Sir, somewhere like 7000*l.* or 8000*l.* in law costs, the shares during all these proceedings being reduced to a mere nominal value, and all the efforts to work the mine effectually paralysed. I have yet to learn whether a little more business capacity and practical tact displayed by these gentlemen at the outset would not have avoided this "successful lawsuit" altogether. Great stress is laid in this circular on their not having interfered with until they had fulfilled their laborious efforts of obtaining the leases. If I read the report correctly, the most important business of the last meeting was to confirm the acts of the Committee in this matter. How, then, can they say that their task is not fully completed?

The plea of placing Mr. Penrose on the Committee to fill the vacancy occasioned by the death of Mr. Willyams seems to me a very lame one, for, unless I am grossly misinformed, the deceased gentleman had not attended their meetings for a long time past, so that we must look upon this as a loop-hole to escape from a false position they have assumed.

One word more, and I have done. What right had the Committee to publish to the world the transactions of any individual shareholder, or to assume that because one of the shareholders happens to be a mine broker that he is not likely to be a permanent adventurer in the concern. I cannot help feeling now more strongly than ever that some new blood is required on the Committee.

Plymouth, June 5. AN OLD SHAREHOLDER.

THE TERRAS TIN MINE, AND CAPTAIN ROGERS AND THE "BEARS."

SIR,—I never yet found a man write in a passion but he not only was in the wrong but he knew it. So does Mr. Rogers, as I shall show.

1.—He, of course, is indignant at it being alleged that he wrote for a purpose, asserts that when he received a telegram to inspect the mine he did not care whether the party employing him was a "bull" or a "bear," and it would have made no difference. *Credat Judeus.* The assertion appears to me to bear a lie in its face. Mr. Hamilton, who has sold very largely for some time, wrote to Rogers, got the order not *from*, as misprinted, but *for* Mr. Waddington to inspect. Now our telegraphs have wonderful powers, but they cannot *yet* carry a paper. Therefore, if he received a telegram, he must also have received a signed order, a letter covering the order, unless delivered personally, with instructions. Who delivered him the order to inspect? If he expects to be believed, let him refer to you the telegram, and a statement on affidavit who gave him or how he got order to inspect; but I shall afterwards show Mr. Waddington's connection with Rogers, and make it evident that he perfectly knew the object of his so-called inspection. Is it the case that Mr. Rogers said to Capt Rickards that he was going to get away by 12 o'clock, in order to go to Falmouth? Whereas he took the day train for London, where he arrived that night, no doubt to communicate to his employer. If this is so, then his visit to the mine was a mere pretence to make a premeditated report upon.

2.—Then he writes: "I found no place in the mine worth 50*l.* per fathom, reported, or any appearance of having been so, only three or four days before there; nor could I see any place then in operation worth as many shillings a fathom." Yet in his letter of May 14 he writes—"The first 6 ft. in sinking the lode was wide, containing some very rich tin, worth probably 30*l.* per fathom." These paragraphs are evidently contradictory, and Mr. Calder, C.E., who spent some and 40*l.* to 50*l.* a fathom; but he took time to look, which Mr. Rogers admits upon the mine, reports in the Journal of June 1 that he saw lodes worth 20*l.* not. Which of the two writes truth? One must be stating what is not true, the other intentionally shuts his eyes, as he says there was nothing to look at.

3.—He goes on to write: "But, seeing the parties are not very particular as regard to facts and figures, it would be satisfactory if the dates of sales were as I very much question if the quantity was raised in the time stated." How accusation of falsehood and fraud against Capt. Rickards. Mr. Rogers might have ascertained this fact, as your readers know it to be fact, for about May sale of ore took place, as was reported in the *Mining Journal*, which must have prised all that was then ready, and on May 9, 10 tons 3 cwts. were sold, which cessarily was the produce of the two intervening months. I never saw a man his neighbour of fraud without some good ground but it was a "reflex of his mind." No doubt Capt. Rickard can answer this if he thinks it worth while. I do not.

4.—As to the loss of 250*l.* a month, repeated again, I think I disposed of this sense, but Mr. Rogers adds: "Capt. Rickard said that if all other costs than tin were stopped they would pay their way. Just fancy, all other costs stopped they would pay their way, yet here is a mine that has paid a dividend." The question is—Did Capt. Rickard say so? I shall not say it is not true, but say that it is totally different from what Capt. Rickard said to me, and I believe he ever said so.

But who is this wonderful Mr. Edmund Rogers? I am informed he is the manager of Wheal Agar, a mine, of course, attended with the greatest possible success under so critical and skilful a manager. Well, on looking at your Share I see Wheal Agar quoted as a mine in 6000 shares of 9*l.* 12*s.* paid, or 57,6

market they would not fetch that. So that here is an absolute unquestionable loss under his wonderful management of 42,600*l.* at least. Is there not a tinge of jealousy at the bottom of his report, in addition to his determination to report for the "bears?" But I have some further information, which causes me to ask what position is Mr. Waddington in with Wheal Agar and Mr. Rogers? Has or had not Mr. Waddington a considerable interest in that mine, and is not Mr. Rogers indebted to Waddington for his continued position as manager of that mine to Mr. Waddington's influence? If there is any truth in this does it not account for Mr. Rogers' "special report" on Terras to suit his bearing employer, even though he says he did not know whether he inspected for a "bull" or "bear." Truly these two parties will require to give a more satisfactory account of their share in these proceeding if they hope to be freed of blame.

5.—Then he admits that he was only two and an half hours on the mine, and asks "Was not that long enough to look at nothing." This quite accounts for his seeing nothing; none so blind as those who won't see. He neither saw the north adit nor the old workings of the Phœnicians, and yet he dares to report that they were not "attended with any profitable results." What a clever fellow! no doubt, but a blind man might have come to an equally sound conclusion.

6.—But what does Mr. Nicholas Ennor say of the district and of Mr. Rogers? I refer both your readers and Mr. Rogers to the letters of this well-known, upright, and skilful engineer in the Supplement to the Journal of last week. His opinion is of real value, honest and able, and of great experience and knowledge. He thoroughly condemns Mr. Rogers. He writes that Mr. Rogers's "special report looks too much like a thing written by a man bent on mischief. I cannot come to the conclusion that he wrote it as a conscientious report; if so, I should not set him down as a judge." Mr. Rogers may select which horn of the dilemma he wishes to be impaled upon. But it occurs to me he had better (if his directors continue to trust him) hide himself in Wheal Agar, where 57,600*l.* of their money has been already hid, and which, after the appearance of him and his friend and supporter, Mr. Waddington, I doubt, but I wish them joy of him if they retain him.

ONE THOUSAND SHARES.

P.S.—As to the "bears," they have made the most of Mr. Rogers's report. It has served their purpose well. But I would like to know who the clique are, who sent a party down to Leeds to work upon large shareholders there to induce them to sell. I heard of it at the time, and now see the results of their success. Can Mr. Hamilton and his friend, Mr. Waddington, tell us about this? Perhaps some of their victims could tell, such as Mr. Gundry. I have seen a lot of his transfers this account, many coming through Mr. Hamilton. The "bears" have had their turn; some still with great loss if they deliver (I have shares out three months), but the mine will outlive them. Had it not been really sound it would have been killed by those "ursa majors" long ago. But *magna est veritas et prevalebit*, which, being translated for Mr. Edmund Rogers's benefit, means—"Truth is great, and it will prevail," even over the Terras "bears" and their *paws*.

TERRAS TIN MINE, AND CAPTAIN ROGERS.

SIR,—I notice in last week's Journal a letter from Capt. Rogers, in which he "repudiates with contempt the assertion that he was employed to make a bad report." Will Captain Rogers deny that he did write his report in London, and that, too, after having interviews with those for whom he is interested? Capt. Rogers secured his authority to inspect for Mr. Hamilton, and that authority he presented when he came on the mine. The following day he proceeded to London, wrote his report, but did not present it to Mr. Hamilton, or even say one word to him about the mine, but put his report into the hands of Mr. Waddington, who was at the time a "bear" of 150 shares. The report then passed into the hands of Messrs. Marlborough and Co., hence its publication in the *Mining Journal*. I here simply narrate facts, and challenge Capt. Rogers to gainsay them. The whole transaction as been characterised with a spirit of unfairness throughout, and which cannot be tolerated even in the slightest degree.

Capt. Rogers says that I informed him that our monthly expenditure amounted to 700*l.* This is quite true; but I did not tell him that if all costs other than the getting of tin were cut off we could pay our way, and must here, therefore, charge Capt. Rogers with untruthfulness. I stated that the mine department amounted to over more than one-half of the total costs, and that we were making excellent profits upon the getting of the tin; and, in addition to my remarks on this point, I wrote him a letter fully explaining this part of the business. Has Capt. Rogers forgotten the statements made in his report? Did he not say that the lode was worth probably 30*l.* per fathom, and the result of his assay of the elvans to be 8 lbs. of tin to the ton of stuff? I would ask Capt. Rogers the value of a cubic fathom at the above rate of produce, and further ask him to reconcile his two statements—the one made, as above, in his report, and the other in his letter, in which he says he saw no place then working worth so many shillings per fathom. Allow me, for Captain Roger's information, to say that stuff yielding 8 lbs. of tin to the ton is worth from 6*l.* to 7*l.* per fathom (cubic) at the present price of tin.

Capt. Rogers is strangely inconsistent, and has indeed seriously forgotten himself. With respect to his advice on the financial department, I beg to remind him that the holders of Terras are men who can well look after their own affairs. In conclusion, Capt. Rogers says, that "2½ hours were long enough to look at nothing." Admitting this to be correct, where did he make this important discovery? Was it when he came on the property? If so, why not be frank and manly, and say at once there was nothing to be seen, and so make an end of it? Or, were his eyes miraculously opened when he reached London, and, being in the predicament of Balam's ass, he could not speak until he saw the angel? MARTIN RICKARD.

Terras Mine, June 6.

TERRAS TIN MINE.

SIR,—In the *Mining Journal* of last week "One Thousand Shares" says—"These same elvans, so very poor, have yielded 10 tons 3 cwts. tin in two months, with only 48 heads of stamps." Taking the number of days in two months as 60, and allowing 1 ton per head per day to be stamped, will give nearly 8 lbs. of tin per ton of stuff. As there are rich lodes in this mine, it may be fairly assumed the ore raised is included in the above average; in that case the elvan must be "poor indeed."

London, June 6. FIGARO.

ST. JOHN DEL REY MINING COMPANY.

SIR,—As the latest private accounts to hand seem, unhappily, to confirm the serious reports current respecting this undertaking, what can be the use of the unwise reticence still practised by the directors? They are not, they cannot be, any more answerable for the recent calamities occasioned by flood than for those five years ago sustained by fire; but they will be most justly held accountable to their fellow-shareholders if they now endeavour needlessly to conceal or gloss over the actual state of affairs. The part of wise men when unavoidably brought into contact with misfortune is to face, and not try to temporarily evade, it. The continued withholding of any particulars, either of the impending call or other reliable information, is, they must be aware, acting at present quite as a dead weight on our shares.—*June 1.* A SHAREHOLDER.

EBERHARDT AND AURORA COMPANY.

SIR,—It would be satisfactory to me, as a shareholder (and I doubt not to many others), if some of your correspondents practically acquainted with the subject would, through the medium of the Journal, afford some information of the comparative advantages of dry and wet stamps. I observe in last week's Journal you state that "it is expected material advantage will be derived from dry crushing"—a statement sufficiently vague to incite further enquiry, so as to be able to form an opinion as to the probable result.

One would have thought that our newly-appointed directorate, if they did not themselves possess the necessary knowledge, would at least have obtained it from other sources, and communicated it to the shareholders. It is a question of vital importance, and one upon which we are entitled to have the fullest information.

June 4. A SHAREHOLDER.

[For remainder of Original Correspondence see to-day's Journal.]

COOK'S KITCHEN.—Consent having been given to Mr. G. L. Basset, the lord of the manor, to the proposed division of the sett of Cook's Kitchen, a special meeting of adventurers was held on Tuesday to carry out the agreement. Mr. C. Bailey took the chair, and amongst those present were Messrs. G. K. Cartwright, A. Lanyon, T. Woolcock, W. Kendall, T. T. Whear, W. Jose, F. Bartle, C. Thomas, J. Thomas, E. H. Rodd, R. Pearce, G. Pearce, V. Pearce, M. Edwards, W. Rabling, J. Cock, E. W. Dabb, W. Nicholls, F. Gilbert, W. H. Rule, and J. Still.—On the motion of Mr. Lanyon, seconded by Mr. Jose, the proposal to divide the sett was approved of.—The meeting then constituted itself into a general one, to make the necessary arrangements for working the New Cook's Kitchen Mine, as it was agreed the new undertaking should be called.—The Chairman stated that Mr. Basset had granted a lease of the sett for 21 years. In the case of Old Cook's Kitchen, Mr. Basset, as they were aware, took only 1-24th of the profits, instead of 1-15th, as he was entitled to do. In the case of New Cook's Kitchen, he had generously consented to take only 1-20th part.—A motion by Mr. Woolcock, seconded by Mr. Whear, that the mine should consist of 2450 shares, now standing in the names of the existing Cook's Kitchen shareholders, was agreed to.—On the motion of Mr. Kendell, seconded by Mr. Rodd, Messrs. R. H. Pike and Son were appointed pursers of the mine, at a salary of three guineas per month, and Captain Josiah Thomas manager, on the same terms. Messrs. Tweedy, Williams, and Co., Redruth, were appointed bankers to the new mine. It was then resolved, on the motion of Mr. Jose, seconded by Mr. Lanyon, that a call of 1*l.* per share should be made.—The Chairman remarked that the mine was to be worked on the Cost-book Principle, but that for his part he preferred the system of rules and regulations, for he wished the concern worked as cheaply as possible, in order that they may keep out of the Stannaries Court.—Mr. Lanyon said they did not mean to go there; the property was too good.—The Chairman said he had some time ago thought the same of Stray Park, and they knew what that had come to.—Mr. Lanyon remarked that if they ever did come to the Stannaries he would endeavour to buy the mine himself.—Capt. Thomas stated that he was looking out for a second-hand 50-inch cylinder engine. One of 45 in. had been offered, and an engineer had gone that day to examine it.—It was resolved that the underground agents of the old mine should act in the same capacity for the new at a salary of two guineas a month. The total monthly expenditure in salaries will, therefore, be ten guineas.—Votes of thanks were given to Mr. Basset, Mr. Cartwright (his steward, who had negociated the agreement with the adventurers), and, lastly, the Chairman.

WHEAL VINCENT.—A general meeting of shareholders was held at Golding's Assembly-room, Callington, on Monday. Amongst a large number present were Mr. W. B. Sanders, of Liskeard, in the chair; Messrs. A. Hicks, E. Philp, J. W. Lawry, E. Nicolls, W. Spry, G. Edgcumbe, W. Edgcumbe, J. H. Colliver, J. H. Smythurst, W. Rickard, Capt. Thomas, and Capt. Odgers. The expenditure for the past four months was about 1100*l.*, and the receipts 1060*l.* To meet the expenses during the ensuing three months a call of 5*s.* per share was made. The following were appointed the committee of management:—Messrs. J. W. Lawry, R. Thomas, J. H. Colliver, A. Hicks, and G. Edgcumbe. The committee were ordered to engage the services of some practical mine agent as manager. The report of the agents stated that there was already raised to surface about 400 tons of tinstuff ready for stamping, and estimated to yield about 500*l.* worth of marketable tin. It was expected that by the end of this month the engine would be ready for pumping the water, and begin to stamp the tin. This sett is situate in the parish of Altarnun, and is very extensive, with five known lodes, from some of which large stones of tin have been taken, yielding not less than 5 cwts. of tin to the ton of stuff; and fair averages have also been tried, and the yield found to be fully 2 qrs. to the ton. The district in which the mine is situate has hitherto been known as a tin-streaming district, and from time immemorial the streamers have been seen on the moors, indicating large deposits somewhere. The importance of the discoveries in Wheal Vincent has been the means of setting several other spe-

Meetings of Mining Companies.

DEVONSHIRE GREAT CONSOLIDATED COPPER MINING COMPANY.

An extraordinary general meeting of shareholders was held at the company's offices, Gresham House, on Thursday,—

Mr. W. A. THOMAS in the chair.

Mr. ALEX. ALLEN (the secretary) read the notice convening the meeting, and stated, in reply to the Chairman, that the gentlemen present were holders of 119 shares, and he had proxies representing 596 other shares, making 715 in all. Four other proxies had also been received, but they were sent in too late to be available.

The CHAIRMAN remarked that the shareholders were acquainted with the resolutions which were passed at the previous meeting, and that it was in order to confirm them that the present meeting had been convened, in accordance with their Deed of Settlement. He would read the resolutions which were offered for their consideration, and then, perhaps, some shareholder would move their confirmation.

Mr. H. SYME REDPATH, said that as the shareholders had heard the resolutions read he would have much pleasure in proposing that the following resolutions passed at the extraordinary general meeting of shareholders of the Devonshire Great Consolidated Copper Mining Company, held on May 14, 1872, be and are hereby confirmed.

1. Resolved—That the whole, or so much of the Deed of Settlement of the company, dated the 28th January, 1845, and of the existing laws, regulations, and provisions of the company, either statutory or otherwise, and of the clauses and articles contained in the said Deed of Settlement as may be legally amended, altered, or repealed, either wholly or in part, for the purpose of registering the company under the provisions of the "Joint Stock Companies Acts, 1862 and 1867," with limited liability, be hereby amended, altered, or repealed accordingly; and that the company be registered, as soon as possible, under the said Acts, with limited liability, with a nominal capital of 51,200*l.*, in 10,240 shares of 5*l.* each.

2. Resolved—That each shareholder in the existing company be entitled to ten shares in the said new company, in lieu of each share held by him or her at the time of the registration of the said new company, and that each new share be credited with 2*s.* per share paid thereon.

3. Resolved—That the present directors of the company are hereby empowered forthwith to carry these resolutions into effect, and that for that purpose, and for framing the necessary Memorandum and Articles of Association, they retain such counsel and solicitor as they shall think fit; and that the present directors be the first directors of the now company.

Mr. BROMLEY had much pleasure in seconding the proposition; and expressed the wish to hear any information concerning the mine which the Chairman might have to communicate to them.

The CHAIRMAN was not aware that he could give them any information about the mine; everything was going on the same as usual, and quite satisfactory. Of course miners were getting scarce, as they all knew, and they were obliged to pay more money for their labour. There was what, he considered, a very unwise step taken a few months since in abolishing the five-weeks month, the consequence of which was that every miner now received 13 months' wages in the year instead of 12. The consequence was that the agents were dissatisfied with the 12 months' pay, whilst the men were receiving 13 months' pay.

Mr. RUTSON enquired how quickly the calls would be made?—The CHAIRMAN believed that the dividends earned would pay cost. Capt. Richards had estimated that the cost would be about 800*l.* per month. At present they were earning 12*l.* per share a-year dividend, so that they could more than pay the cost out of profits.

Mr. REDPATH estimated that if the work were done in three years they would about have to forego the dividends they were now receiving, or if it were extended over six years they would receive half the dividends they were now receiving.

The resolution was then put to the meeting, and formally confirmed, and the proceedings terminated with the usual complimentary vote of thanks to the Chairman.

GENERAL MINING COMPANY FOR IRELAND.

The half-yearly meeting of shareholders was held on Monday at the offices of the company, Westmoreland-street, Dublin,

Mr. W. R. FAYLE in the chair.

The following is an abstract of the report read by Mr. BAKER, the secretary:—

The directors have to announce that the opening of the calamine mine has been accomplished, and that regular drawings of the ore are now being made from the engine-shaft. The cost of the opening and of erecting the buildings and providing the machinery has exceeded the estimate, while the time occupied in the work has been much greater than was calculated upon, owing principally to the difficulty of getting any ironwork, even of a simple description, supplied by the makers in a reasonable time. No little difficulty was also experienced in securing a sufficient number of miners, but it has been in a measure overcome. The breaking and wheeling of calamine in the mine is now going on regularly. The appearance of the mine for calamine is very satisfactory. The opening of the calamine mine has been accomplished in good time to supply the zinc oxide furnaces with a rich ore. For some time past the returns have been steadily diminishing, owing almost entirely to the stock of poor ore on the surface gradually becoming of a percentage too low to be suitable for profitable use in the manufacture. The sales during the period have been the highest yet reached, but the actual quantity of zinc oxide produced has been much below the average, and the working expenses have been heavy, owing to the exceptionally high price of coal during a portion of the time. A richer class of ore is now being used in the furnaces, and with a fair yield of zinc oxide, and a continuance of the demand for it at the present prices, this branch of the company's operations should show a profit. The proposed issue of redeemable debenture bonds not having met with an adequate amount of support, the directors had no alternative but to make a call of 10*s.* per share, payable on June 18, to pay off a portion of the bank debt, and to meet pressing current liabilities. In paying the call credit will be allowed to each of the shareholders who made advances to the company last January for the amount of such advance, with interest thereon at 6 per cent. The distribution of the shares in the Shallee Silver-Lead Mining Company has been advisedly delayed at the request of the directors of that company, and in accordance with what the directors considered to be the interests of their co-proprietors.

The CHAIRMAN moved the adoption of the report, which he said contained everything they had to say in reference to the affairs of the mine. They had not endeavoured to make things look better than they really were.

Mr. EDWARD HODGSON seconded the adoption of the report, which was agreed to.

Messrs. Edward M'Mahon and John D'Arcy were appointed auditors.

A vote of thanks was accorded the Chairman, and the meeting separated.

LEVANT MINE (ST. JUST).

The first meeting of the new company (formed for the purpose of re-working Levant) took place on Tuesday at the account-house on the mine. During the past six months satisfactory progress has been made in the formation of the new proprietary, and in arrangements connected with the new and extensive works. Under the able management of Capt. Henry Boyns satisfactory results have been obtained. On the surface heavy repairs have been effected, especially in the steam-stamps, which is worked by an excellent 33-in. cylinder engine, capable of driving 90 heads, if required. The pumping-engine is also now being enlarged to a 45-in. cylinder, and will soon be nearly equal to a new one. Messrs. Harvey and Co., of Hayle, have their portion of the work in hand. Underground levels are being cleared, and shafts put in thorough order and repair. Returning to the surface, the burning-house, dressing-floors, and all operations connected with the tin-dressing have been reconstructed. The man-engine has also received special attention. The engine connected therewith is being enlarged from a 20-in. to a 24-in cylinder · 200 fathoms of best pitch-pine rods have been purchased to fix in the engine-shaft, and a large lift of 9-in. and 10-in. pumps arranged with new gear from the 54 fm. level to the adit. By the various alterations now in progress the effectual drainage of the mine will be amply provided for.

Mr. E. DAVY, Chairman of the committee, occupied the chair at the meeting. The accounts, as produced by Mr. Richard White, the secretary, showed:—Dr.: Purchase of mine and materials, 2876*l.* 16*s.* 6*d.*; tin in stamps, slime, &c., 400*l.*; 13 weeks' water-charge, 156*l.*; total purchase money, 3432*l.* 16*s.* 6*d.*; wages, 1354*l.* 8*s.*; merchants' bills, 1324*l.* 13*s.* 6*d.*; coals, 183*l.* 13*s.* 11*d.*; total expenditure, 6307*l.* 8*s.* 5*d.*—Cr.: Balance on receipts of calls, presuming all calls are paid (after payment of purchase, &c.), 1348*l.* 1*s.* 1*d.*; tin sold, 411*l.*; sundries, 89*l.* 9*s.* 6*d.* The total credits (including calls and ore sales, &c.) amount to 7655*l.* 9*s.* 6*d.*; leaving a balance now in hand to the credit of the adventurers of 1348*l.* 1*s.* 1*d.*, which is carried forward to the credit of the next account.

Mr. FIELD, of Marazion, was elected on the committee, to fill the vacancy caused by the death of Mr. R. R. Michell, of Marazion.

Capt. HENRY BOYNS presented to the meeting an interesting detailed report of the underground operations, which stated that at the 150 fm. level north a new lode has been cut worth 6*l.* per fathom. Men are employed on the back of the 150 south, which is yielding fair quality tinstuff. There are two ends driving north worth 4*l.* per fathom for tin. The south end is also yielding good stones of tin. At the 130 a cross-cut north of the man-engine shaft is now driving, expecting to cut a copper lode in a week more. This level has been repaired and re-laid with tramroad for 150 fms. long. The 100 fm. level is driven east on Flat lode, valued at 7*l.* per fathom. The ground over this end is all standing whole to the surface. On Boscriggan lode there are four pares working for tin on tut over the 18 fm. level, and three pitches on tribute. The Guide is being sunk under the 80 fm. level, which is opening paying ground. Throughout the mine nine ends and cross-cuts are now driving and exploring new ground, from which important discoveries are anticipated. The Guide shaft is also sinking on tutwork below the 80, and is opening fair tin ground. Nearly 100 persons are now employed underground; also, nearly 100 persons more are engaged in the various surface operations; and, as the underground operations extend, a considerable number of additional hands will be taken on. The returns of tin ores will now gradually increase, for the various levels are yielding good quantities of tinstuff.

A resolution was unanimously passed at the meeting, and entered in the cost-book, expressing the deep regret of the adventurers at the loss sustained by the death of Mr. R. R. Michell; to whom the Chairman most kindly referred as having been one of the chief promoters of the resuscitation of the working of this mine, and of the formation of the new company.

There are in all 80 shareholders, and the number of shares of the company is fixed at 2500, on which 2*l.* per share is called up. The shareholders present were—Messrs. Edmund Davy, J. B. Coulson, R. White (secretary), R. Boyns (Boswedden), T. W. Field, A. G. Michell, T. T. Pool, H. C. York, R. Boyns (Bank), R. Thomas, P. Olds, R. Quick, W. R. Tresize, B. Bosence, W. Holman, J. N. Douglas, W. J. Cocking, A. J. Barnett (for Messrs Bolitho), F. H. James, W. G. Hill, R. B. Searle, N. West (Hayle, for Messrs. Harvey and Co.), E. Borlase, J. Berriman, and E. Perrow; Dr. Bennett; and Capts. H. Boyns, Thomas, J. Tresize, W. T. White.

The Chairman produced at the meeting copies of the new leases from the lords, in which there is one clause to the effect that no dues on any tin or copper ore shall be paid to the lords until such a time as the mine shall be able to pay its working costs.

Mr. RICHARD WHITE (secretary), after the accounts were audited and passed, made some most interesting observations on the past history and present prospects of Levant. He considered they had inexhaustible resources in their sett. They had immense reserves of tin ground in the various levels, which would, at present rates for tin, pay well. He was quite confident that, with a vigorous and judicious development of good old Levant, the shareholders would be ere long rewarded by handsome dividends.

The eminent geologist, Mr. W. J. Henwood, F.G.S., F.R.S., &c., in his elaborate and valuable work on "Metalliferous Deposits," &c., Vol. V., gives a most interesting section and plan of the Levant Mine, which not only exhibits the various workings, but also a curious indent on the killas formation; the intersection of the killas with the granite being very irregular in the course at some of these tortuous points. Enormous deposits of mineral have been met with during the former working of the mine. Mr. Henwood's seems as if he almost exhausted the subject in his comprehensive and tabular statement annexed to the plan of Levant, where the most minute details are furnished on the varied stratum of that locality. In fact, Mr. Henwood's volume affords to the geological connoisseur an inexhaustible store of information on all subjects connected with mining, &c., in the whole of the St. Just district.

MINERAL HILL SILVER MINES COMPANY.

A meeting of debenture-holders has been convened for June 18, to confer with the directors. The report of the managers (Messrs. John Taylor and Sons) states—

That when this enterprise was first presented to them, such evidence was adduced as led them to believe that the mineral hill contained deposits of silver ores of extraordinary richness, and that the mines which had been opened in it were likely to be unusually productive. They relied greatly upon the evidence which was placed before them of Mr. Melville Atwood, an English mining engineer of well-known scientific attainments, who, having practised his profession in California for nearly 20 years, had acquired great experience in mining for the precious metals in that country. Mr. Melville Atwood accompanied Mr. J. Taylor, jun., and assisted him in his examination of the mines, and they both gave estimates of the quantity and value of the ores discovered in the workings and lying in heaps at the surface. The reports of the investigations received from Mr. Atwood and from Mr. John Taylor, jun., left no room for doubt or hesitation on their part, and they felt fully warranted, after long consultation with Mr. John Taylor, jun., in endorsing his report with a statement that they considered the property one of the richest groups of silver mines which had been presented to their notice, and which would yield unusually large profits; under that conviction they consented to become managers of the business of the company, and invested a considerable sum in the debentures by which the working capital as well as the cash portion of the purchase-money was provided. The reports alluded to were published with the prospectus of the Mineral Hill Silver Mines Company, and it was thought by others, as well as by themselves, that the cash payment to be made for the mines was justified by the value of the piles of ore on the surface, the reserves in the mines, and their peculiarly rich character. They can have no doubt that the appearances of the silver deposits in the numerous excavations, treacherous as they have proved, were such as to justify the terms in which they were described by Mr. John Taylor, jun. In some instances the deposits were worked open to the day as quarries, the miners breaking very rich ores from the sides and bottoms of these pits, while in others large caverns had been excavated which had yielded great quantities of ore, and in which splendid bodies of mineral, consisting of rich varieties of silver ore were to be seen in the roofs and bottoms as well as in the sides and ends of the chambers. That Mr. J. Taylor, jun., did not over estimate the value of the heaps of ore at the surface they have full assurance by the returns of bullion which have already been made from them. His estimate of the value of the ore discovered and in sight underground was made upon a computation of the quantity of ore existing within certain limits, and upon a calculation of the amount of silver bullion which it would yield. The value of the ore was computed from the examination of samples taken by himself from the different mines, and from the books of the Milling Company, giving the result of working upon large quantities of ore. That a large quantity of rich silver ore had been previously taken out of the mines is undoubted, and from that which remained in view, and in the dump piles, the bullion actually obtained by this company from the date at which Mr. Taylor, jun., inspected the mines to the end of March, 1872, has realised 121,233*l.*, and the value of the ore still remaining on the surface at this latter date was estimated at 28,875*l.*, making together 150,108*l.* All this was obtained from the ore which Mr. John Taylor, jun., saw during his first inspection, for no fresh discoveries of any importance have been made. It is, however, now manifest that the value of the discovered ore was much over-estimated, but Mr. J. Taylor, jun., explains in his report that the deficit arises principally from the fact that the richness of the ore raised latterly has been much below what he estimated it at, its quality having fallen off as the limits of the deposits were approached, and the enclosing rock became mixed with the mineral, and this has caused the cost of working to be considerably increased, it being necessary to remove a far larger quantity of rock than was anticipated in order to get a ton of ore of fair per centage. Of the capricious nature of certain deposits of metallic ores in limestone they have had frequent experience; but it is well known that many of the richest and most profitable mines in the world have been found in that rock, and knowing that the rock of which mineral hill consisted was limestone, they directed special attention to evidence of regularity and durability of the formation, and this they deemed to be sufficiently indicated by the apparent continuity of the mineral in a great number of excavations, ranging for about 800 feet along the outcrop of the deposits. Active operations having been commenced on the company's account in April, 1871, the mines immediately gave a considerable produce. Mr. J. Taylor, jun., having again inspected them in Sept., 1871, returned with the conviction that they would fully realise his original anticipations. This opinion was supported by the unhesitating declaration of Mr. Oakes, the superintendent, who wrote soon after his arrival at Mineral Hill that from what he had seen of the mines he considered the company had a most valuable property, and that the mines would do all Mr. John Taylor, jun., had said about them. In conclusion, they would wish it to be understood that, grievous as the loss and disappointment in this case have proved to be, from the sudden and extraordinary falling off in the value of the mineral deposits both in quantity and quality, it was impossible for anyone to foresee changes of such a character. They yet entertain a hope, discouraging as the prospects now are, that discoveries of ore may be made; and so long as the management of these properties is entrusted to their care, they shall not fail to use their utmost exertions to obtain the best return from them that is possible.

The report of Mr. John Taylor, jun., states that the sudden depreciation in value of the property has greatly astonished him, and it is with feelings of the greatest disappointment that he now undertakes the task of describing its present condition. The rapid failure of the deposits of ore has been startling in the extreme, and he should think almost unprecedented in the annals of mining. Of the fact that the deposits in these mines were of extraordinary richness the shareholders have had ample proof in the large returns of bullion made month after month from the commencement of the company's operations; but that the deposits of ore have failed in almost every instance is, he is sorry to say, but too true. The falling off in value of the mines has been extremely rapid, and the deposits have failed not only at one or two points in this sudden manner, but in nearly all the workings. The limestone beds at Mineral Hill as they are followed in depth are disordered and irregular, and they could discover nothing in them giving any indication as to the probable presence of ore; nor are there any strings, branches, or walls to follow. It is a notable fact that in every instance in which ore deposits have up to the present time been found on this hill that their presence has been indicated by an outcrop at the surface of quartz, interspersed with more or less mineral matter. The entire hill has been most carefully searched, and no more outcrops of the same nature have been met with. It is, therefore, only to deeper explorations that they can look for future discoveries. Before he left he reduced considerably the number of miners, thereby effecting a saving of about $1000 per week, considering that it is much better to confine their efforts to a few bold trials than to continue a number of small excavations into the sides of the old ore chambers, which have not hitherto led to any good results. The expense of labour is now so heavy that the cost of sinking shafts and driving tunnels in the limestone rock varies from $15 to as much as $30 per foot. In the peculiar position of the company's affairs it is extremely difficult to make any recommendation with regard to the future working of the mines. This was very carefully and anxiously considered by Mr. Oakes, Captain Hoskins, and himself; they consulted several experienced miners who have lived there and watched the progress of the working of that district from the commencement to the present time, and they came to the conclusion that if further exploratory works are to be continued there are two points at which it is most desirable that vigorous trials be made—the Silver Queen and Taylor tunnels. Running as they do, one from the northern extremity of the workings on the hill in a southerly direction, and the other from its western slope in an easterly course, the exploration they will make of the ground at their respective depths will be very complete. In addition to these tunnels it was agreed that the shaft from the bottom of the Giant Mine should be sunk to a considerable depth, to prove as quickly as possible the beds of limestone underlying that large ore chamber; and that a level should be driven south upon the branch of quartz which has been met with in the 120 feet level at the Giant Mine, and continued as long as the quartz can be traced. In the cross-cut to the eastward, from the bottom of the Mary Anne shaft, it would be well to drive out a considerable distance, as the ground in that direction is quite unexplored at present. The cost of prosecuting these trials with vigour will amount to about $2500 per month. He finds upon examination of the ore account that his estimate of the dump piles was below rather than above the actual value. In estimating the ore in reserve underground he took into consideration—first, the deposit in the Giant Mine, which was the only one worked to any depth; and, secondly, the powerful nature of the deposits throughout the mines, being influenced by their appearance in the sides of the various chambers: but he finds that latterly, if the ore extracted had been treated as broken from the mines it would not have given anything like the average on which he based his calculation. This variation in the assay value of the ore has much surprised him, as the ore exposed in almost every part of the mines was of rich quality, and the Milling Company's books showed that no low grade ores had been returned. His estimates of the reserves in April, 1871, were made independently, after a careful examination of the property, and the view he then took of their value was more than confirmed by the opinion of Mr. Attwood. It was the unreserved opinion of one so well qualified to form a judgment, confirming his impressions as to the lasting character of the deposits, which made him unhesitatingly express the opinion he did as to the future returns which might be expected from the mines, and recommend the erection of a largely increased number of stamps. Since the present company took possession of the property, up to this time, no work has been done on tribute; but he considers that it will be highly desirable to lease some of the mines very shortly to parties who will work them, returning to the company a certain proportion of the ore they raise. It will not answer to adopt this system so long as they are able to raise ore as at present; but in one or two of the mines in which no more ore is to be seen, and in which no work is at present being done, Capt. Hoskins will make arrangements to let tribute bargains as soon as he can find parties of good miners to take them. Having gone carefully through every item of cost, he finds that, heavy as the charges appear, every effort has been made to keep down the expenses, and to purchase all required stores at the lowest possible prices, and he is satisfied tha nothing more could have been done in this way. The cost of labour is enormous,

the lowest wages for miners being $4 per day, caused by the great demand for all skilled labour which various new enterprises has created. Attempts have been made for some time past to reduce this rate, but without success. Upon any reduction in their wages being made, the men simply leave for other mining camps. The freight of stores during the last winter has been a very heavy item of cost, the weather having been unusually severe, and continuous falls of snow rendering the roads almost impassable. Having taken into consideration the failure in productiveness of the mines, the reduced quantity of ore remaining on the dump piles, and the necessity for the exercise of economy in every way, he arranged to discontinue working one of the mills, thereby effecting a reduction in the cost of $8000 per month. Trial is at present being made upon a tolerably extensive scale of the tailings which have been dammed up and collected in the ravine below the mills, and he hopes that by careful treatment in the amalgamating pans, and the exercise of great economy in every way, a fair profit may be obtained by working them. If the trial should prove this to be the case, the quantity of tailings, which is probably not less than 5000 tons, is sufficiently large to keep the pans in the new mill at work for several months to come. In conjunction with the agents he has made the following estimate of the probable results of the working of the mines and mill up to July 1:—The amount of bullion shipped during the month of April was estimated at $60,000, for May at $40,000, and for June at the same amount. The estimated cost for the month of April was about $27,000, for May $23,000, and for June also $23,000. The result for the three months (from April 1 to June 30) should, therefore, be as follows:—Returns, $140,000; costs, $73,000; excess of receipts, $67,000. Beyond that date it is impossible to form any estimate of what can be done, as with the present low rate of production from the mines the stock of ore on the dump piles will then be nearly exhausted, and should no fresh discoveries be made the only sources of profit will be from what little ore may still remain to be extracted from the old workings, from the treatment of custom ore, and from the tailings. That such extensive and rich channels of ore ground should be so suddenly cut off, and not found to continue to a depth of more than 60 or 70 feet below the suface, has astonished him greatly. That the trials now in progress may prove successful, and fresh discoveries of value be made, is his earnest hope. He expresses his strong appreciation of the manner in which the business of the company has been carried on in Nevada. The difficulties encountered have been many, and of the zeal and energy displayed by the company's superintendent and agents in overcoming them, he can only speak in the highest terms.

THE CAPE COPPER MINING COMPANY.

The ninth ordinary general meeting of shareholders is to be held on Monday.

The report of the directors congratulated the shareholders upon the prosperity of the company's operations. The whole of the ores raised during the year 1870 have been sold, and that they have realised 170,397*l.* 7*s.* 7*d.*, an amount greatly in excess of any that could have been anticipated at the date of the last annual general meeting. The average price realised has been 16*s.* 6*d.* per unit; that of the last sale, May 7, was 20*s.* 6*d.* per unit; the average assay has been 30½ per cent. The costs for 1870 were estimated in the accounts presented last year at 113,000*l.*; they have proved to be 113,400*l.* The result is a realised profit of 56,997*l.* Of this sum, 12,500*l.* has already been distributed in dividends; the further dividend of 20*s.* per share, which has since been declared for the quarter ending June 24, 1872, will absorb 20,000*l.* From the balance 4756*l.* has been applied to the sinking funds, 4266*l.* added to the reserve fund, and 8711*l.* devoted to the extinction of all the items on the credit side of the balance-sheet which did not represent realisable assets. The directors were prevented last year from making the usual reduction from these items, in consequence of the ascertained deficiency in the stocks of ores accumulated during previous years having so materially affected the divisible profits of 1869. The existence in the accounts of these items occasioned a serious reduction in the working capital, and their removal, together with the release, by means of the railway, of the large sum of money locked up in the stocks of ores lying at the mines will very shortly greatly relieve the finances, and also save the large charge for interest which has been unavoidable during the last few years. A balance of 6762*l.* 11*s.* 5*d.* remains to be carried forward to the next year's account. The superintendent reports that upon the removal of the stocks of 1870 ores, no deficiency has appeared in the total estimated monthly returns of raisings; and as those of 1871 have been sufficiently cleared from the mines to prove that they also will return full weight, he is forwarding a quantity of about 350 tons, averaging some 30 per cent. assay, which had been collected from various sources, and held to guarantee the returns of 1870 and 1871. The net proceeds of this quantity will appear as a credit to the year 1871, in addition to the returns reported at the foot of the cost and returns account of that year. Capt. Tonkin, who had been carefully selected by the managers to succeed Captain Williams as chief mine agent, after a careful study of the distinctive peculiarities of the mines, estimates the amount of reserves discovered at Ookiep considerably lower than that of his predecessor; especially if those which have since been developed by the increased depth given to the main shaft be taken into account. This divergence of opinion does not probably so much indicate a contradiction as to fact, as the amount of evidence which is sufficient to convince different characters of mind. Ookiep continues to yield very large and valuable returns, and its appearance leads to the opinion that the ore bed extends in width as it increases in depth. Spectakel is yielding a fair profit, and gives hope of improvement. The trials at Springbok and other centres have not yet resulted in any important discovery, but they continue encouraging.

The result of the smelting operations carried on during the past year has been to show that at the average price of 15*s.* 9*d.* per unit, which the regulus of 1871 has realised, no profit can be obtained upon the smelting of refuse ores, but a fair profit is being made at the prices now ruling, and considerable quantities of low-class ores are thus being turned into cash at an earlier period than if they were left till they could be treated by the existing means of dressing. The fact that the greatly increased price of copper may enable the smelting works to show a profit is not a consideration which should form an element in deciding as to their commercial value, since it would also have enabled the ores to be brought to market at an equal or greater profit without being smelted, whenever the means of transport may become adequate to their conveyance. A gradual improvement in the economy of smelting appears to be taking place, but should it not be continued to a satisfactory extent, smelting at Ookiep will only be proceeded with until the stocks of fuel in the colony have been consumed. The Automaton dressing machines now being shipped will, it is hoped, remove many of the difficulties which rendered imperative a renewed trial of smelting operations. At Spectakel Mine there are special features which render smelting more promising. The scarcity of water prevents dressing from being carried on beyond a very limited extent, there is a good deal of brushwood in the neighbourhood which can be used as fuel, and a sufficient variety of ores to make a proper smelting mixture is there found in close proximity one to the other. After allowing for interest at the rate of 6 per cent. per annum upon the capital invested in the railway, the profit during 1871 has only amounted to 1791*l.*, and this result was only attained by allowing to the railway the same high rate of carriage as was formerly paid to the native carriers by ox wagons.

The conditions upon which the debenture bonds were subscribed for were that this rate of carriage should be credited to the railway, and that the entire profit resulting from it should be retained as a guarantee for their repayment at maturity. One-third of them are repayable on July 1, and it is not proposed to renew them. The small amount of profit earned by the railway has been somewhat disappointing, but many allowances must be made for the difficulties inseparable from the initiation of any new undertaking, but especially of one of this kind, in a country so arid, and possessed of such few internal resources as Namaqualand. It is not yet definitely ascertained whether locomotive traction, all circumstances considered, is in such a country more suitable and economical than that of animals, especially when it entails an extra expense for maintenance of the permanent way of some 4000*l.* per annum. The profit earned by the railway will be very greatly increased if a larger traffic can be provided for it, but this can only be done by continuing the line to the mines. Several most important results will ensue from such an extension. It will greatly increase the profits of the line by extending its sphere of operations, and the reduced cost and increased facilities of transport will enable the immense quantities of moderately rich ores existing in numerous localities possessed by the company in Namaqualand, to be brought to England at a profit, and thus give that character of permanence to the company's operations which no one mine, however rich, can ensure. It would also dispense with much of the expensive labour now required to dress the ores to a sufficiently high standard to bear the present excessive cost of transportation. The avoidance of the necessity to unload at the point of junction of the railway and road traffic will enable the ores to be brought home in bulk; and thus the cost of bagging, which is very considerable, will be saved, and the large amount of capital at present locked up in the stocks of bags will be set free. The directors have decided to proceed at once, though by degrees, with the completion of the line, and thus to avoid the otherwise necessary dispersal of the skilled staff who are now employed in the formation of that part of it already authorised. The successful result of the section now completed in removing the great lock-up of capital, caused by the serious accumulation of the stocks of ores, will, it is considered, ensure the provision of sufficient means for the completion of the undertaking, without diminishing the dividends, and even without necessitating a renewal of the debenture bonds now and hereafter falling due. The only link, after the completion of the railway, that will require removal from the chain of circumstances which has impeded the transport of the company's ores to market will be the difficulty of shipment at Port Nolloth—these, it is hoped, may be overcome by the use of a steam-tug, which the directors are about to purchase, and they have under consideration the practicability of improving the Port so as to enable large vessels to come over the bar, and lie with safety within the inner anchorage. The directors have had the satisfaction of prevailing upon Mr. Wild to give them the advantage of his valuable services as special superintendent for a somewhat longer period than he had originally intended, and the shareholders may rely that now, as heretofore, no pains will be spared on the part of the directors, or of the officers of the company, to work to the best advantage the fine property entrusted to their management.

NORTH HENDRE.—The directors of the North Hendre Lead Mine, near Mold, paid on June 1 an interim dividend of 2*s.* 6*d.* per share, being 1114*l.* 8*s.* 6*d.*

WHEAL MARY HUTCHINGS.—The quarterly meeting was held at the mine on May 29 (Mr. John Arnold in the chair), when the accounts to end of April showed a credit balance of 806*l.* 0*s.* 1*d.* The report of the manager, Capt. H. Miners, was considered very satisfactory. A dividend of 6*s.* per share was declared. Mr. Broad was elected purser of the company in lieu of the late John Wills Stephens, at a salary of 6*l.* 6*s.* per month. Capt. Miners says—"In conclusion, I would just say, although some points of the mine are not looking so well as last reported, yet, when looking at the change in the character of the ground in the bottom levels, together with the promising appearance of the lode, my opinion is still strengthened by the fact that if the mine is opened up in depth it will make a good and lasting one. Tin sold during last quarter 16 tons 13 cwts. 1 qr. 2 lbs., realising 1552*l.* 8*s.*"

CENTRAL SWEDISH IRON AND STEEL COMPANY (Limited).—The statutory meeting of the shareholders was held on Tuesday. Major-General Sir C. Dickson, K.C.B., R.A., who occupied the chair, said that the current year's make of iron had been sold at advantageous prices, and is already in course of shipment. A trial shipment of the company's ores has been forwarded to the North of England, to be tested by the ironmasters: it contains on an average 65 per cent. of iron per ton. It was also stated that the discovery of seams of coal of great thickness in certain lands adjoining a portion of the company's property has considerably enhanced its value, and that the question remains for future consideration by the shareholders whether this property should be retained and developed by the company or sold to other parties, by which even now a very considerable profit can be be obtained by this company.

[For remainder of Meetings see to-day's Journal.]

LONDON GENERAL OMNIBUS COMPANY.—Traffic returns for the week ending June 2, 11,106*l.* 7*s.* 3*d.*

FOREIGN MINES.

The usual half-monthly reports from the various Brazilian mining companies are not yet to hand, owing to the French packet being delayed at Rio de Janeiro for repairs. The agents have written *via* Liverpool that the despatches shall be sent forward by first opportunity after their receipt.

DON PEDRO (Gold).—Copy of telegram from Lisbon: Produce weighed to April 30, 6634 oits. Estimate for April, 5634 oits.

GOLD RUN HYDRAULIC.—Telegram from the company's agent at Gold Run:—23 days run. We have cleaned up $6300 gross; $3000 net.

YUBA.—Mr. Mattingly, under date Atlanta, Idaho, May 1, writes—During the entire past month the weather was cold, and the spring has been as remarkable for its backwardness in taking off the snow as the winter was lavish in supplying it. The roads are yet blocked up, but a few days, such as to-day, will render them passable, as the snow is fast melting away. Will commence work in the mine in May, sinking and taking out ore. I had assays made yesterday of such ore, or sample of it, as we shall begin to extract. Result as follows:—Sample 1, $620 36 c.; sample 2, $50 10 c.; sample 3, $340 91 c.; sample 4, $30 10 c. per ton of 2000 lbs. average samples from the strata taken. I expect no difficulty in getting out all the rock of this kind we can work, and perhaps better from the indications. It will be three weeks yet, however, before we can haul ore from the mine to the mill; no such season for backwardness has ever occurred within the knowledge of anyone. I intend to rent or hire the Monarch Company's mill, and have been negociating with that view. It is run by water-power, has ten stamps, and eight pans, all in order. I believe I can get it for $500 per month, and as it is run by water-power the expenses of engineers and wood would be saved, as from running our mill, which would be between $350 and $400 per month, making it cost us only about $100 more to run than our own mill, and we could work much more ore than in ours at present, from want of more powerful engine; I would also expect to run our own mill, and be able to supply both with ore, and would also expect or intend to put in a larger engine as soon as circumstances would allow it; all we want is to be able to crush and work enough rock, and I think this course would do it. The expenditure for April is $81. The shareholders will be pleased to hear that Dr. Bishop left England for the mine on April 25.

ECLIPSE (Gold).—Capt. Sam. Jones, the mining engineer who accompanied the Chairman to the mines in April last, has forwarded a detailed report on the property to the directors. He says—The Eclipse Gold Mining Company's property is located on the western slope of the Inyo Mountain range, about 1000 feet vertical from its base, and 3½ miles east of Owen's River, Owen's Valley. This valley is about 100 miles in length, and its average width about 10 miles. The Sierra Nevada Mountain range, with their eternal snow-clad tops towering to the clouds, forming its western boundary, and the Inyo Mountain range its eastern. This valley for its entire length is drained by Owen's River, a magnificent stream, with sufficient fall to give, as it were, unlimited hydraulic power. I have very carefully examined the Eclipse lode, and do not hesitate to pronounce it a pure free gold quartz lode. . . . I have briefly recapitulated the principal features of this property as I find it, and, in conclusion, beg to say that the entire management here has been of the most extravagant and non-practical description I have ever met with during my mining experience of 45 years. A large amount of money has been spent on the surface that should have been spent in the mine in order to develope it and test its value, but I do congratulate you on having such an extensive and valuable property. The mine is a good one, I doubt not. It is a strong, masterly, well-formed lode, and auriferous throughout, and well situated for successful development. I hope that in one month from date we shall get the mill to work, and commence to make permanent and profitable returns. Labour at present is deficient.

BATTLE MOUNTAIN,—Capt. Richards, May 16: Virgin: Bishop's winze, sinking to the bottom of the 113 ft. level, is down 66 ft., with no change in the ground since last report; the stuff produces a good trace of silver. We shall run a drift westward before sinking much further, to cut and prove the main hanging wall, which should be about 25 or 30 ft. from the present bottom of the winze. In the 113 feet drift north work is being done when men can be spared, and this point looks encouraging, producing stones of good ore. In the stopes south of Roach's winze, in the back of the 113 ft. level, are producing a quantity of very fine ore. The 73 north is of a promising character, with a regular hanging wall, but producing no ore at present. In the back of the 73, south of Jury's rise, the lode is from 6 to 8 ft. wide, containing a quantity of rich ore, but considerably mixed with waste rock.—Lake Superior: A cross-cut is being driven eastwards to prove the width of the lode, and it produces iron pyrites and a little copper. Daniel's rise has been stopped, but will be resumed in a few days. There were 473 sacks raised during the week.

INDEPENDENCE (Gold).—May 5 and 10: The company has received advices of these dates from the agents in San Francisco and at the mine, reporting that the opening up of the new east chute was finished at the end of April, which gives an immense amount of good paying ore. The chute runs parallel with the old east chute, and extends east on the ledge towards Sierra Buttes, in which mine it is being worked near the boundary line in their No. 2 level, and being easily mined and milled it would leave good profits. There was a plentiful supply of water, and the winter, which had been a most trying one for most mines in the State, being over, there was every prospect of being able to erect the new machinery, and work the mine without interruption, the mine being now in a position to supply the mill to its full capacity, with pay ore from above the adit level.

PESTARENA UNITED.—C. J. Harvey, June 2: Gold returns for May: Val Toppa: 253 ozs. 4 dwts. 19 grs., from 627·973 tons of ore.—Pestarena: 32 ozs. 17 dwts. 18 grs., from 42·270 tons of ore.—Total produce for May: 286 ozs. 2 dwts. 13 grs., from 670·243 tons of ore. The gold from Pestarena has been obtained by the treatment of some ore remaining on surface, and in the cleaning up at Old Mill Houses. I am glad to say we have now hopes of fine weather, for a time at least, and the carriage of ore has been resumed with extra teams, so as to secure as large a supply as possible at the reduction works before the close of the season.

BENSBERG (Lead Mining and Smelting).—J. W. Hoffmann, May 31: The weather during this month was mostly favourable for our operations, and the sinking of the shaft was continued to 30 ft., beyond which we could not sink without steam pumps. We have to contend with a great quantity of water. The ground was magnesian limestone occasionally, containing traces of lead and iron pyrites; towards the bottom a slight change appeared, quartz and grauwacke being found in the limestone. The hands being mostly engaged at the shaft, and labourers being very scarce, no ore was dressed during the first three weeks of the month, and no sampling took place. The present pump shaft in the opencast was carried down 12 feet deeper, and good wash ore was found at the bottom. The trenches are neing increased to 7 ft. in depth, of which 3 fms., commencing at the pump shaft, are now done. Here we struck upon a bed of rich carbonate, which assayed 60 to 65 per cent. of lead, and very good wash ore. Fresh ground is being uncovered to get at the carbonate, and a clearing has been made for a tramway. The boiler made in Cologne has been delivered, and is seated. The boiler and engine from Liverpool have not arrived, but may be expected daily. Part of the dressing machinery is ready, and the rest will be finished shortly. Our sampling for June will be less in bulk, but richer in quality than hitherto.

MENZENBERG MINE (Near Honnef, Germany).—The following is a report by Capt. John Lean, specially commissioned by the directors to inspect and report upon this property:—Having, in accordance with your request, visited and carefully inspected the above-named mine, I respectfully beg to hand you my remarks thereon. This mine is situated on the eastern side of the Rhine, and about two English miles from the railway station at Honnef, and, therefore, possesses great local advantages for the transport of ore, material, and so on, and a tramway could easily be constructed on a gentle decline from the mine to the railway, or to the side of the Rhine, by which the produce could be conveyed direct to Rotterdam, and from thence to England. The operations at the mine I find consist of three shafts—Dickins, Josephs, and Adit shafts, and an adit. The adit is extended about 65 fms. into the hill, and communicated with the adit shaft at the depth of 14½ fms. A side level has also been extended several fathoms, with the object of intersecting a caunter lode. First, then, the Dickins shaft; this shaft has been sunk about 22 fms. below the surface, on a lode of great width, strength, and capabilities, but it has been worked to comparative hollowness in the vicinity of the shaft from near the surface to the present bottom of the shaft by the ancients. It is of a certainty the identical lode of the great and celebrated St. Josephberg Mine, which has been worked from time immemorial, and has yielded almost incalculable wealth; this lode is traceable in its unvaried course for a distance of upwards of two miles. The sinking of the Dickins shaft has accompanied more or less the hollows, or non-filled excavations of the ancients, almost from the surface to its present bottom, a circumstance which has rendered the operations both tedious and expensive, but that the shaft would come upon the old workings, and so have been interrupted by them, I presume could not have been anticipated, whilst the surface or sward was yet unbroken. There are no indications that the old workers had ever erected any machinery for pumping, and as the shaft has now reached to about the level of the valley below, whence an increase of water would naturally have taken place with them, it is highly probable that the bottom of the ancient workings has been reached.

The Joseph shaft has been sunk 16⅓ fms. from the surface, with the object of exploring the lead lodes; one of these, a large promising lode, is seen at the depth of about 14 fms. from the surface in a cross-cut, and is there 20 ft. from the shaft, and has an underlie towards it, but as so small a portion only of it can be seen, it is difficult to judge of its angle of declination. Another similar lode, with an opposite underlie, is stated to be on the opposite side of the shaft, but being concealed by timbering of the shaft, I could not see it, and as I could not see or ascertain the angle of declination of these opposite lodes towards each other, it is impossible for me to say at what depth they will unite. The manager, who has seen also the now concealed lode, says that their junction will take place in about 2½ fms. more sinking of the shaft. It would, no doubt, be most desirable to see the junction of these two large lodes, the ore of which possesses all the qualities of a lead-bearing lode, although it has no visible lead ore, but from the excess of water which obliges the pump and barrels constantly going, the sinking of the shaft is rendered both slow and expensive. The future working of the mine, unless it may be determined to continue the Joseph shaft to the junction of the two lodes, I would recommend that for the present your operations be confined solely to the Dickins shaft part of the mine. Sink the shaft 20 fms. below its present bottom, and there, when you may expect to find yourselves deep in virgin ground under the workings of the ancients, and whence from the hollows met with in sinking, and from the ore also found, it is quite evident that they extracted great riches. Drive both north and south on the lode, and also east and west, in order to intersect the other lodes which you have in your concession. As the hill rises rapidly on the eastern side of the shaft, I would recommend that a cross-cut be driven in that direction. At the present bottom, as beforesaid, the lode which has accompanied the sinking of Dickins' shaft is that of St. Josepberg: its character, nature, and accompaniments, as well as the stratum in which it is embedded, are identical with that great and prolific mine, so that if they had riches there, there is no reason why the same may not be fully expected in the Menzenberg; a probability strengthened by the fact that, in Menzenberg the ancients above the level of the present bottom extracted great riches. In sinking the shaft below the level of the valley an increase of water may naturally be expected, and as you will be obtaining a greater depth, and will also, when 20 fathoms deeper, be extending and enlarging the scale of your operations for the proper development of your mine, I would beg to recommend the erection of a small portable steam-engine, which would answer the double purpose of extracting both water and stuff. The sinking of 20 fathoms in the shaft should occupy (say) five months, and I presume should cost about 12*l.* per fathom—say, 250*l.* No wire-tram should as yet be made, no land bought, nor any langerei (acid reducting works) as yet be erected; all can be brought about in the proper time. It will be time enough to accomplish these matters when you have, by the further development of your mine, ascertained its riches, its worth, and requirements, and established its durability. Have the ore in the whole unbroken ground, and you can soon get the necessary appliances and erections, but I do not think that for the sake of the ore you now have you should incur the expense. There is sufficient space to obtain all the refuse that will be extracted from the shaft in the 20 fathoms sinking. No purchase of land for this purpose is as yet required.—The Ore: This is perhaps, may be utilised by langerei precipitating process, but in no other way. It is also the lodestuff, produced in sinking the shaft, (say) from 40 to 50 tons, which by reducing it to 20 tons might be made just of the same quality as that already prepared. An average sample of the prepared ore I have brought to England as well as specimens of ore of the better class. There is also (say) 2 tons, which probably contain 12 per cent. of copper, and (say) 8 to 10 tons of 8 per cent. In conclusion, judging from the character of the lode, its great width, strength, and capabilities, and seeing that it possesses all the characteristics of the lodes in the joining rich mines, I fully believe that nothing is wanting, but a little time and perseverance in the manner described to make the Menzenberg Mine equal to its neighbours.—JOHN LEAN.

[For remainder of Foreign Mines see to-day's Journal.]

MINERAL WEALTH OF AUSTRALIA.

The great revival of industry in the Bendigo gold field dates from January, 1870, and judging from the results of the past two years workings the prediction that a glorious future is in store for Bendigo is shown to have been fully justified. The yields of 1871 are in excess of 1870, and that there is great confidence in the richness of the claims is evidenced by the fact that during the last ten months of 1871 no less than 765 companies were registered, with a nominal capital of about 9,000,000*l.* Up to November, 1871, there were 1310 companies in operation. The great feature of the year was the important discovery in the Golden Gully Consolidated claim, Glasgow line, about the end of August, quickly followed by the opening up of the splendid reef in the Golden Fleece claim, Stanley line. The immeasurable importance of these discoveries at once placed the southern side of the gold field on a par with the previously more favoured northern side, fresh impulse was given to many previously neglected claims, fresh ground was leased on every hand, while in the opposite direction, on the most remote confines of the gold field, the rich discoveries of Feeley's Reef, Whipstick, strengthened the belief in the illimitable size of this quartz field. The progress of a gold field closely connected with water supply, and for this reason Lieut.-Col. Sankey's demnation of works which would have assisted the attainment of an abundance of water will never be forgotten. It is remarked that in Australia water supply must always be an engrossing topic, and that "the argument applicable to the Ind applies—Irrigation is all that the camel is to the desert Arab, or the canoe to the seaboard savage . . . If you once look after your irrigation you may leave everything else to look after itself. 'And why not put off this piece of expenditure until I see my way quite clearly?' I replied, that the key of finance is population, and the key of population food, and the key of food water; and that if you neglect your waterworks your financial resources are sure to be injured by famine.

Bills are now pending for enabling the Sandhurst City Council to purchase the works of the Bendigo Waterworks Company, and to improve the mining laws of the colony generally, so that there will be every encouragement given to capitalists to lend their assistance to the district. In the second annual edition of the Bendigo Gold Fields Registry, which has just been received in this country (published by Messrs. Trübner and Co., of Paternoster-row), and from which the above observations are extracted, an enormous amount of information is given which cannot fail to prove valuable to intending investors in the mines. The author being Mr. J. T. Macartney, late *Argus* mining correspondent for Sandhurst, is a sufficient guarantee that the information given may be relied upon, and to ensure its completeness he has secured the co-operation of Mr. H. B. Nicholas, C.E., mining surveyor and inspector, who has supplied many important plans, and of Mr. W. Nicholas, who has furnished some interesting Notes (illustrated) on the Bendigo Gold Field. The volume contains an excellent description of the field, and an account of all the principal reefs; an alphabetical list of companies; and an article on the Fryer's Creek Quartz Mines, as well as information upon other matters in which those engaged in mining in the district are likely to take an interest. The particulars given are rendered the more readily comprehensible by the admirably executed plans by which they are accompanied, and of which there are more than twenty. The work is altogether a very useful compendium, and will doubtless be appreciated by those for whom it is intended.

MINING IN NEVADA.—In the preface to our last mining report we were encouraged, from the favourable appearance of the weather, then to announce the opening of spring. Since then one of the severest storms known by the oldest settler of the country, which appears to have prevailed from the Pacific to the Atlantic coast, set in, and mining operations have been retarded in consequence. By the commencement of next month we confidently expect that many mines now idle will be in operation.—*White Pine Daily News, May* 11.—[This explains why Nevada mining operations remain temporarily in abeyance.]

CAMP FLOYD.—Business at present is very active, which is based upon the actual merits of the mines, and not upon wild speculation. A large 20-stamp quartz mill, built under the supervision of Capt. E. H. Shaw, the general manager of the Camp Floyd Silver Mining Company (English), is now fast approaching completion, and will be in running order by May 15. The bed of a tramway from the mill site to the mines has recently been finished, and the laying of the track will be immediately commenced. They are now vigorously at work, developing their property, and have already struck a rich body of ore. The mines are situated within a radius of two miles from Lewiston, the most prominent of which may be considered the Sparrow Hawk. There are about 60 men employed upon this great mine sinking shafts and blasting out in the open cuts and tunnels, and it is turning out large bodies of rich ore from their different places. Recently two new places were discovered, containing immense deposits of rich sulphurets of silver and horn silver, and, if present indications are not very deceptive, the Sparrow Hawk will be a formidable rival in fame to the world-renowned Emma. There is, however, this difference between the mines that the ore of the Emma is argentiferous galena, while the Sparrow Hawk is equally rich in almost inexhaustible stores of milling quartz and sulphuret ores. The Last Chance and Marion, two other very good mines, as well as the Sparrow Hawk, are owned by the Camp Floyd Silver Mining Company.—*Scientific Press* (San Francisco).

UTAH NEWS.—The warm weather in Utah is causing the snow to disappear rapidly from the canons, and the miners are resuming work in all quarters. Prospecting parties are starting out, and mining matters all look favourable. Nine smelting furnaces, costing in the aggregate $300,000, are now in operation near Salt Lake City. It is understood that the work of building the first section of the Salt Lake and Pioche Railroad is to be commenced immediately. Grading on the Utah Southern Railroad progresses rapidly.

QUICKSILVER.—The Oakville Quicksilver Mine has recently developed a fine body of rich ore, which has so far been sunk upon 20 feet without the miners having gone through it. It is to be hoped that all the mines in that section of country will be equally as successful, when we may hear of this essential metal being quoted at much less than 85 cents per pound. It is said that this mine has 1300 tons of ore on the dump, including 200 tons of a very rich quality. A new furnace is shortly to be erected.—*Scientific Press* (San Francisco), May 11.

CLIFTON SILVER MINING COMPANY.—Yesterday we visited this famous and valuable lode, whose name is familiar to all Coloradians. Through the courtesy of Messrs. Dowlen and Ramage we were enabled to make a thorough examination of the mine, and the work and developments now in progress. From what we there saw we are more fully convinced than ever before of this lode's vast extent and richness. The Clifton is located on the mountain of the same name, which forms the divide between Russell and Willis gulches, and Idaho. It, with its extensions, is owned by the Clifton Gold and Silver Mining Company, being one of the mines sold by the London and Colorado Company, which is still buying and selling lodes. This property has a total length of 7200 feet, extending north-easterly and south-westerly across the summit of the mountain which here forms the boundary line between Gilpin and Clear Creek Counties. The portion of the property on the Clear Creek side is known as the Rara Avis, and tuat on the Gilpin side as the Clifton proper. Beyond the former is the Rara Avis Extension, which crosses Virginia canon. The Clifton and Rara Avis lodes are favourably located for working, being so situated that mining can be carried on by tunnelling instead of by the more expensive sinking of shafts. Two tunnels are being driven at different elevations on each side to meet near the centre of the mountain. They follow the vein of the Clifton, and are opening up the mine in admirable shape. Near the south-westerly or Clear Creek end of the Rara Avis an exploring adit has been driven 102 feet, at a lower level than can be reached on the opposite side of the mounfain. This adit has cut across the lode called the Avon, on which the company claim 3000 feet. Further up the mountain is the Clifton tunnel east, now in 61 feet. This is being driven to meet the Clifton tunnel west from the opposite side of the mountain. The latter is in 204 feet, and exposes a crevice about 6 feet wide, with a pay vein of over 2 feet. A railway of a very superior kind has been constructed in this tunnel, furnished with the useful ore cars for conveying the material to the surface. This tunnel has cut a cross lode called the Severn, also the property of this company. Some distance above a level has been driven 90 ft., and will soon intersect the main shaft at its present depth, which is 150 ft., and thus act as an air circulator for the mine. This shaft is very substantially timbered, and has a pay vein of rich ore 5 feet wide in the bottom, with 8 feet width of crevice. On a level with the mouth of this shaft the upper tunnel is being driven through the mountain to meet that which is being pushed from the opposite or Clear Creek side. The former is in 274 feet, and the latter 64 feet. This tunnel when completed will be 1800 feet long. Below the tunnel on the south-westerly or Rara Avis end is a prospecting shaft, which was sunk to open the lode at that point. On the dump at the main shaft and mouth of the tunnel on the Clifton are about 2000 tons of ore, which carries from $40 to $360 per ton in silver, with a smaller proportion of gold. The property of this company is now opened out so that 250 tons of ore can be mined per week, and as the tunnels progress this quantity can be increased. The vast extent of the pay material, which improves in quantity and quality as development progresses, proves the Clifton to have no superior and but few equals in mineral wealth among the silver mines of Colorado. What is needed for the successful treatment of its ores are concentration works on Clear Creek, at Idaho, or at the junction of Willis and Russel, near the east extension of the Searle and Kokomo, being the east end of the same lode. From either point a tram railway could be built and operated without difficulty at any season of the year. The Clifton forms a portion of an immense vein extending several miles, proving it to be a true fissure vein. The Clifton Company have secured in their purchase property of untold value, which is destined to enlarge very essentially the bullion product of this district.—*Colorado Herald*, May 8.

MICA.—Prof. Cook, State Geologist of New Jersey, reports having examined a mica mine in Warren County, New Jersey. The mica occurs in a vein which crosses the rock strata in a north-west and south-east direction. It is covered with earth to the depth of from 8 to 12 feet. This has been removed in one place so as to show the full breadth of the vein to be from 12 to 14 feet, and has been uncovered along the vein for 20 feet. A pit sunk 25 feet north-west of the large opening shows the continuance of the vein thus far, and there is every appearance of its being a continuous vein in the north-west and south-east directions, with a dip of about 60° to the south-west. The mica is in large and handsome plates; many from 6 to 12 inches across, some 18 inches, and in one place the bottom was a plate of mica 2 feet wide. The whole vein appears to be composed of mica, and nearly all of a quality to work into plates for stoves.—*Journal of Applied Science.*

IMPROVED STEAM-TIGHT PISTON.

FIG. 1.

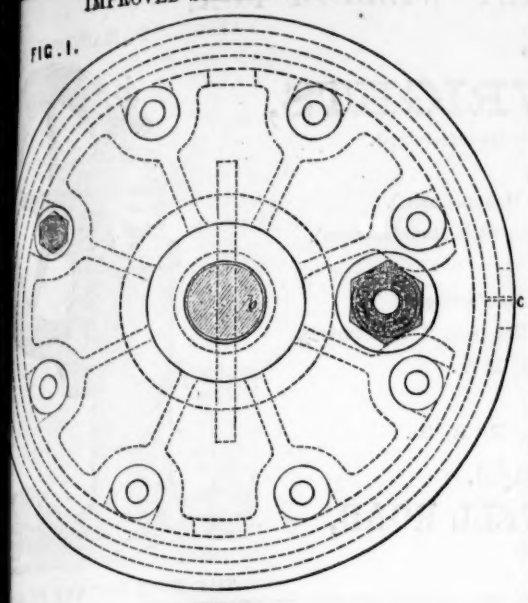
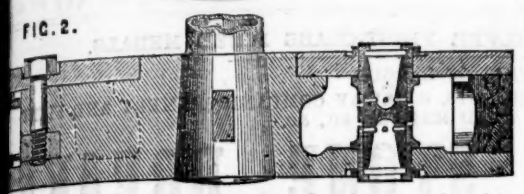


FIG. 2.



The important economy resulting from keeping an engine piston properly packed is well known to all who have anything to do with the use of steam, and the number of contrivances from time to time introduced to secure this desirable object has been very great. For the past few years an arrangement has been in use which has given very general satisfaction, and as the invention may now be considered to have been fairly tested, a diagram of it is subjoined. The invention in question—Martin's improved pistons—consists in the introduction of a double-chamber valve in the body of the piston. Openings are provided around the sides of these chambers and communicate with the interior of the piston, so that as the piston moves to and fro the valve is forced in the opposite direction, allowing the steam to press or tighten the rings against the sides of the cylinder in such a manner as effectually to prevent any escape of steam from one side of the piston to the other. The advantages claimed for these pistons over those of ordinary construction are, economy in fuel from the saving of steam that would otherwise escape, and additional power from increased vacuum effected by the non-escape of steam; increased power also from the friction being constantly in proportion to the load. It is stated in showing the importance of this that the case is different with spring or packed pistons, for these when tight produce the same amount of friction whether the engine is heavily loaded or running light; lastly, effecting a great saving in labour and materials in opening cylinder for tightening or renewing springs, bolts, nuts, gasket, patent packing, &c., and in preventing delays.

In the above diagrams Fig. 1 represents a plan of the piston, and Fig. 2 a transverse section on *a*, *b*, *c*, showing all the details of the construction and parts. It will be seen that there is nothing complicated in the arrangement; and with regard to the question of wear and tear it will suffice to mention that the inventor, Mr. T. H. Martin, of Swansea, has for nearly three years had under his own immediate charge several of these pistons up to 45 in. diameter, which have been working night and day, and consequently he has had every opportunity of closely watching their progress. From thorough examination just made of the cylinders and pistons, which in the meantime had not been opened or in any way repaired, they were still perfectly steam-tight, and in good working condition in every respect.

* The following Articles were unavoidably crowded out from last week's Journal—

OUR UNEXPLORED COAL FIELDS.

The fifth meeting for the season of the Royal Colonial Institute was held at the theatre of the Society of Arts on Tuesday evening, the Duke of MANCHESTER, the President in the chair; there being present, amongst others, Admiral Ryder, Professor Ramsay, Sir Richard M'Donnell, Sir Harry Parkes, Sir Louis Mallet; Dr. Hunter and Mr. Saunders, from India; Dr. Mouat, Mr. Engelheart, and the Agent-General for Queensland.

The paper for the evening was by Mr. C. W. EDDY, the hon. secretary, and was on the natural distribution of coal throughout the British Empire. After adverting to the vast and yearly increasing export of our own coal, amounting last year to nearly thirteen millions of tons, he proceeded to show that immense stores of excellent coal existed in almost all our principal colonies, and that in these colonies the coal fields are, as a rule, situated near the coast; that in some of our colonies these resources are as yet almost untouched, and that however rapid may be the exhaustion of our own coal, as long as the Empire is maintained in its integrity, its supply of fuel is not likely to fail. He described in detail the coal resourses of the Dominion of Canada, the vast beds of coal in Nova Scotia, a section of one of which, 39 ft. thick, was exhibited here in 1862, and showed that these are in the neighbourhood of Halifax, the western sentinel of the Atlantic, and thus at one extremity of the intercolonial railway which is to unite the various provinces of the Dominion. He described the extensive coal fields which the Canadian Pacific Railway will cross in approaching the passes of the Rocky Mountains, and those in which it will terminate on the shores of the Pacific—Vancouver Island at the western extremity being a complete counterpart of Nova Scotia on the east in containing the only good steam coal to be met with on their respective sea-boards. He next showed the great extent of the coal fields of New South Wales and Queensland, of Tasmania and New Zealand, and referred to various tables which were exhibited in proof of the excellent quality of much of this coal for steam purposes. After describing the various coal-pits of India, and showing that the supplies there lie almost entirely within British territory, and near the great lines of railway, both present and prospective, which will unite the different Presidencies together, he commented on the difficulties interposed by Indian red-tapeism in the development of these resources. After referring to the coal of Formosa, China, and Japan, both of which latter, as well as the entire coast of the Pacific, are dependent on coal of British origin for steam purposes, he concluded by remarking that, whilst gold fields served the purpose of diffusing the English race over the whole world, the steam coal, which is found so exclusively in British territory that it may almost be claimed as a British mineral, may be made the means of binding the scattered Anglo-Saxon communities into one nation.

Admiral RYDER gave some information on the supply of coal to the Navy, and showed how great the advantage would be of utilising the colonial resources, as the lecturer had pointed out, for naval purposes. He also dwelt on the necessity of fortifying our depôts of coal in all parts of the world, and of retaining within the empire the colonies which contain such supplies of fuel.

The AGENT-GENERAL for QUEENSLAND spoke as to the vast resources of coal in that colony, and the great importance of its geographical position for mercantile and naval purposes.

Professor RAMSAY, referring to the great need of a really national Museum of Economic Geology explained that the building in Jermyn-street was only intended to display the resources of these islands, and did not suffice for that.

Mr. EDDY, in reply, considered the Professor's remarks conclusive as to the great need of such a museum, which should represent the whole empire, and stated that there was some ground to hope that a commencement of one would be made next year—the Queensland collection, perhaps, forming a basis for it.

The PRESIDENT announced that the annual meeting of the Institute would be held on the 26th June, and the general dinner at the Crystal Palace on the same evening.

THE COAL MINES REGULATION BILL, 1872.

[FROM A CORRESPONDENT.]

Read in connection with the several bills for the same object which have for some time past been before Parliament, the present is in many respects an entirely new measure; yet it seems probable that it is still far from having reached the state in which it will become law. The clauses which will lead to the largest amount of discussion are those which regulate the employment of women and children, and the settlement of general and special rules, next to which, perhaps, will stand those regulating the certificating of managers. Many of the provisions, as they now stand, are especially objectionable, such as empowering the Inspectors of Mines to disqualify schoolmasters for incompetence; but these will, doubtless, be modified when they come before the House.

The fifth clause is a most remarkable one; it prohibits the employment of boys between 10 and 12 years old below ground, "except in a mine in which a Secretary of State, by reason of the thinness of the seams of such mine, considers the employment ne necessary." The question which naturally suggests itself to anyone acquainted with collieries upon reading this provision is, what possible justification can there be for authorising younger children to work in thin seams than in thick? If there be any difference in the healthfulness of a coal mine (though we entirely disagree with the opinion that coal mining is less healthful than any other description of labour carried on in the same districts) that difference would decidedly be in favour of the thicker seams, and it cannot be assumed that even the framers of the Bill suppose that a coalmaster would employ children between 10 and 12 years old as hewers in either thick or thin seams; the clause is evidently ill-advised altogether. The succeeding clause provides that boys between 12 and 13 years old, and of lads under 16 (the Bill calls these "male young persons") shall not work underground for more than 54 hours in one week, for more than 10 hours in one day, or except under certain other restrictions. The eighth clause, which provides for obtaining certificates of the attendance of children at school, fixes the punishment for forgery at "imprisonment for a period not exceeding three months, with or without hard labour." With regard to surface, no child under eight years is to be employed, and no persons, whether women or children, except under certain restrictions. The regulations of the Act with respect to boys between 10 and 12 apply to the children between 8 and 10, and all above 12 are under the same regulations as lads under 16. One hour and a half interval for meals be allowed whenever the period of employment exceeds six hours.

Certificates will be required, it seems, from managers only; and as the candidate must give satisfactory evidence of sobriety, experience, ability, and general good conduct to entitle him to a certificate, there appears little to object to. Demanding experience as a qualification will exclude mere School of Mines students from positions which would jeopardise the safety of the collieries entrusted to their care, and requiring evidence of sobriety and general good conduct is no less important if the lives of those employed in mines are really to be protected, Existing managers can obtain certificates upon complying with certain formalities. The certificate of managers may be suspended or cancelled if the Court appointed to deal with cases of neglect find that the holder is unfit to discharge his duty. The fee for examination is 2*l.*; for registration of certificate of service, 5*s.*; and for copy of certificate, 5*s.* It is provided that in case of accident the coroner's jury shall not include any person having a personal interest in, or employed in, or in the management of the mine wherein the accident has occurred; it is difficult to say whether this would be desirable or undesirable, for although it is, doubtless, desirable that the jury should be impartial, there are many cases in which the effect of the prohibition would be to limit the summoning officer's choice to chandler's-shop keepers and beerhouse keepers, neither of whom are the most desirable members of a jury. In the general rules the proviso in the first general rule has been expunged, so that the noxious gases must at all times be rendered harmless, and the men are given power to inspect the mine monthly, but beyond these the alterations are unimportant. Regarding the Bill in its entirety, it appears most unlikely that it will give satisfaction to anyone, so that the further consideration of it may fairly be delayed until the amendments suggested upon re-commitment are made known.

INSTITUTION OF CIVIL ENGINEERS.

The annual Conversazione of the President of the Institution of Civil Engineers was rendered far more attractive than usual on Tuesday evening, in consequence of Mr. Hawksley (the President) having availed himself of the assistance of Mrs. Hawksley in selecting those who were to be honoured with invitations. This circumstance, coupled with the fact that it had been arranged to hold the assembly in the beautiful picture galleries of the Exhibition building, instead of in the comparatively limited suite of rooms available at the Society's house, in Great George-street, permitted the presence of a large number of ladies, thus giving an entirely novel character to the gathering. The notion that business can be satisfactorily combined with pleasure is, perhaps, somewhat open to the objection that it is often fallacious; yet there were many who, notwithstanding the increased facilities afforded for passing an additional enjoyable evening with their wives or daughters, to whom the invitations were extended, regretted the absence of the models and specimens of inventions designed to promote the progress of the arts and industries with which the civil engineer is identified. Nor did the articles shown by exhibitors at the International Exhibition afford any compensation, since they were by no means so numerous as the visitors had been accustomed to see at Great George-street, and comparatively few of them were really new. Perhaps the most prominent pieces of machinery in the upper rooms were the Kastenbein composing and distributing machines, exhibited by Mr. John Walter, M.P., and at present, we believe, in daily use at the *Times*, whilst in the lower rooms the Siemens' apparatus, for forwarding messages by pneumatic pressure, appeared to attract the most attention.

Another invention, which was examined with much interest, was Mr. Skelton's catoptric lamps. For some time past these lamps have been in general use on Waterloo-bridge; and, although not an extra lantern has been put up, and the size of the burner has not been enlarged, the vastly improved manner in which the bridge is illuminated is observable to all who use the bridge. The reason is simple enough. The amount of illuminating power obtainable from a given flame is uniform, but it is practicable to diffuse or concentrate the light as we may think best; in the case of street lamps, this fact had not received much serious consideration previously to the invention of Mr. T. A. Skelton, of Essex-street, whose arrangement, however, is so simple that surprise is now generally expressed that one-half of the light supplied by the street lamps should so long have been allowed to remain unutilised. In Mr. Skelton's lamps upward radiation is entirely prevented, and as the reflectors, which consist of slips of silvered glass placed at various angles, can of course be made to bring down the otherwise wasted rays at any desired angle, each lamp can readily be fitted with a pattern that will ensure the maximum amount of useful illuminating power from each foot of gas burnt; this maximum is proved by the photometer to be three times that now obtained. As the reflectors are only placed at the upper part of the sides, and in the roof of the lantern, the most sceptical cannot complain that the advantage of the catoptric system is counterbalanced by any evil created. The reflectors act upon no rays which are now utilised, but merely utilise those now wasted. The lamp certainly constitutes an important improvement in street illumination, and will doubtless, when better known, come into very general use.

The printing machines which attracted the most attention were the "Echo" and the "Walter," both of which were in the lower rooms, however, and were, therefore, not nearly so carefully inspected as the articles in the picture galleries and refreshment corridors. The pneumatic apparatus of Messrs. Siemens and Halske were in every part of such excellent solidity and finish that they would really have excited wonder had it not become so customary to examine the beautifully finished apparatus especially connected with electricity and intercommunication which for some years past that firm has been accustomed to exhibit at International exhibitions. Mr. Richardson's admirable pneumatic loom, which for some years past has been gradually increasing in favour, and as the invention is readily applicable to existing looms, it is to be hoped its use will ere long become general. Mr. Conisbee's "Atlas" printing machine, for printing circulars, bill-heads, invoices, &c., at high speeds was in full operation, and doing excellent work, and there was an ingenious self-acting lithographic machine, exhibited by Messrs. Figgins, of Farringdon-road, working equally well. The whole of the visitors appeared to be highly entertained, although many expressed the hope that it was only intended as an exceptional departure from the "President's conversazione" to which they had been accustomed.

COAL TRADE.—Mr. J. R. Scott, the Registrar of the London Coal Market, has published the following statistics of imports and exports of coal into and from the port and district of London, by sea, railway, and canal, during May:—

IMPORTS.

By sea.	Ships.	Tons.	By Railway and Canal.	Tons	c.
Newcastle	186	107,974	London & North-Western	81,440	8
Seaham	12	4,743	Great Northern	80,149	0
Sunderland	85	50,272	Great Western	54,223	0
Middlesborough	7	2,492	Midland	125,726	0
Hartlepool	50	17,869	Great Eastern	78,600	0
Scotch	16	4,657	South-Western	2,377	12
Welsh	7	3,224	London, Chatham, & Dover	23	15
Yorkshire	42	10,415	South-Eastern	881	13
Small coal	1	316	Grand Junction Canal	694	5
			London, Brighton, & So. Coast	2	0
Total	406	201,962	Total	424,207	13
Imports during May, 1871	488	210,066	Imports during May, 1871	398,256	13

COMPARATIVE STATEMENT, 1871 AND 1872.

	Ships.	Tons.		Tons.	c.
Jan. 1 to May 31, 1871	2508	1,186,934	Jan. 1 to May 31, 1872	2,076,800	18
Jan. 1 to May 31, 1872	2170	1,155,855	Jan. 1 to May 31, 1871	1,833,362	11
Decrease in the present year	338	31,079	Increase in the present year	243,438	7

COPPER.—J. Pitcairn Campbell and Co. (Liverpool)—The total sales during the fortnight are nearly 10,000 tons Chili bars at 104*l.* to 110*l.* per ton, and 3000 tons Chili ores and regulus at 19*s.* 6*d.* to 21*s.* 6*d.* per unit. A cargo of Cape ore sold to arrive at 21*s.* 6*d.* per unit, and at the Swansea Ticketing, on May 21, 1687 tons ore, average produce 14¼ per cent., realised 20*s.* 2*d.* per unit. Arrivals here during the fortnight of West Coast, S.A., produce:—Cuzco, from Valparaiso, 340 tons bars and 265 tons ingots; Cambrian, from Valparaiso, 118 tons bars; Vanguard, from Valparaiso, 50 tons bars; John Elder, from Valparaiso, 400 tons bars; Antilles, from Valparaiso, 40 tons bars. At Swansea, Pacific, from Lota, 456 tons bars and 150 tons ingots. Stocks of copper (Chilian and Bolivian) in first and second hands, likely to be available, we estimate at—

	Ores.	Regulus.	Bars.	Ingots.	Barilla.
Liverpool ..... Tons	—	—	8,400	1100	—
Swansea	—	—	3,605	445	—
Total	—	—	12,005	1545	—

Representing about 13,500 tons fine copper against 23,900 tons May 31, 1871; 18,300 tons May 31, 1870; and 11,000 tons May 31, 1869.

TIN.—Messrs. Van Houten and Ebeling (Rotterdam, June 1) write—With the exception of a few days of buoyancy tin has been very quiet throughout the past month, and though there has been no pressure to sell prices have slightly given way. The favourable position of the article has been entirely counterbalanced by the irregular transactions in Straits tin in London, that market being under the influence of several "bear" operators, whose wild sales for forward delivery cannot give but a temporary check to legitimate trade, while they are likely to strengthen the value of the article in the course of the year. Banca has been in limited demand, the price fluctuating between 95 fl. and 96 fl., while some "bear" sales for autumn delivery were reported at 91½ fl. to 93¼ fl., there being little disposition either to buy or sell at these prices. Billiton has been very neglected; a few spot parcels changed hands at 92½ fl. On Monday, the 3d inst., a public sale, comprising 8000 peculs Billiton, will take place at Batavia. The position of Banca tin in Holland on May 31, according to the Official Returns of the Dutch Trading Company, was:—

		1872.	1871.	1870.
Import in May	Slabs	14,564	4,322	15,220
Total five months		43,957	49,850	89,652
Deliveries in May		7,000	15,693	12,300
Total five months		39,638	69,149	60,890
Stock second-hand		47,229	82,542	78,821
Total stock		70,721	131,680	152,415
Stock of Billiton		5,908	6,651	6,800
Import in May		3,800	3,000	4,200
Delivered and shipped in May		2,700	3,771	6,091
Quotation of Banca		96 fl.	76 fl.	78¼ fl.
May 31. Billiton		93	75	77¼

These returns, compared with those of 1871, exhibit—An increase of the import for May of 320 tons, a decrease of the import for the five months of 1872 of 184 tons, a decrease of the deliveries for May of 272 tons, a decrease of the deliveries for the five months of 922 tons, a decrease of the stock second-hand of 1104 tons, a decrease of the unsold stock of 801 tons, a decrease of the total stock of 1905 tons, an advance of the quotation of Banca of 3*l.* 6*s.* per ton. The quantity of Banca tin now afloat for the Dutch Trading Company is 8500 peculs, equal to 515 tons, against 17,300 peculs, equal to 1081 tons last year. We estimate the quantity of Billiton tin now afloat at 6601 peculs, equal to 400 tons, against 10,320 peculs, equal to 625 tons, last year. The Government returns for the month of March are as follows:—

EXPORT OF TIN FROM HOLLAND.

	March.			Three months.		
	1872.	1871.	1870.	1872.	1871.	1870.
Germany ..... Tons	201	167	140	624	521	466
England	13	124	143	35	363	236
Belgium } France }	45	71	322	319	225	896
Hamburg	23	23	5	76	23	16
United States	—	—	16	—	—	16
Other countries	3	5	1	15	29	10
Total	295	390	627	1069	1161	1340

CHEMICALS AND MINERALS—J. Berger Spence and Co., Manchester, June 5.—Soda: Cream caustic, 60 per cent., 17*l.* 10*s.* to 17*l.* 15*s.*; white, 19*l.* to 19*l.* 5*s.*; soda ash, 3*l.* to 3¼*l.*; soda crystals, 7*l.* 5*s.* to 7*l.* 10*s.*; bi-carbonate, 17*l.*; salt cake, 4*l.* 15*s.* to 5*l.*; Glauber salts, 3*l.* 15*s.* to 4*l.*—Borax: Refined, 93*s.* 6*d.*—Nitrate of Soda: At 14*s.* 3*d.* to 14*s.* 6*d.*—Potash: Muriates, 80 per cent., at 10*l.* 5*s.* to 10*l.* 10*s.*, f.o.b.; prussiate, red, 3*s.* 1*d.*; yellow, 1*s.* 7*d.* to 1*s.* 7½*d.*; chlorate, 1*s.* 9*d.*; bichrome, 8*d.*; potashes, 38*s.* 9*d.* to 39*s.* 6*d.*; pearl ashes, nominal.—Saltpetre: Foreign, 32*s.* to 33*s.* 6*d.*; refined, 37*s.* to 38*s.*—Alum: 8*l.* for loose lump; in export barrels, 8*l.* 15*s.*; ground, 9*l.*—Bleaching Powder: At 15*l.* to 15*l.* 10*s.*—Ammonia: Sulphate: White and grey, 21*l.* 10*s.* to 22*l.* 10*s.*; brown, 20*l.* 10*s.*, 23 per cent.; carbonate, 7*d.*; muriate, 28*l.* to 30*l.*; sal ammoniac, 1sts, 49*s.*; 2nds, 48*s.*—Iron Salts: Green and rusty copperas, 57*s.* 6*d.*; dry copperas, 52*s.*—Copper Salts: Sulphate of copper, 32*l.*—Arsenic, 7*l.* 5*s.* to 7*l.* 10*s.* for white powered.—Acid: Tartaric, at 1*s.* 7*d.*; oxalic, 1*s.* 1*d.* to 1*s.* 2*d.*; sulphuric, 3*l.* 10*s.* to 3*l.* 15*s.*; carbolic, 1*s.* 2*d.* to 1*s.* 3*d.*—Magnesia: Epsom salts, 4*l.* 17*s.* 6*d.* for refined.—Pitch: At 20*s.* to 22*s.*—Benzole: 30 per cent., 3*s.* to 3*s.* 3*d.*; 50 per cent., 3*s.* 3*d.* to 3*s.* 9*d.*; 90 per cent., 4*s.* 6*d.* to 4*s.* 9*d.*—Disinfectants: Patent, 5*l.*; carbolic, 10*l.*—China-clay, 24*s.* per ton.—Pyrites: Spanish cupreous, 8*d.* to 8½*d.*; non-cupreous, 10*d.*—Phosphates: Ordinary, 60 per cent., 10½*d.* to 11*d.*; high strength, 85 to 90 per cent., 1*s.* 3½*d.* to 1*s.* 4*d.* per unit; Estremadura, 1*s.* 3*d.*—Superphosphates: 25 to 26 per cent., 3*l.* 10*s.* to 3*l.* 12*s.* 6*d.*—Precipitated Phosphate of Lime: 40 to 50 per cent., 5*l.* 10*s.* to 6*l.* 10*s.*—Manganese: Ores, 140*s.* to 150*s.* for 70 per cent.—Iron Ore: Hematite, 30*s.* to 38*s.*; oolitic, 7*s.* 3*d.* to 9*s.* 3*d.*

USE OF METALS AS FUEL.—An inventor proposes to substitute metals for coal as fuel for ocean steamers, and has taken out a patent for a method of carrying out his views, his object being to obtain a larger amount of steam from a given quantity of fuel. His theory is this:—When coal is burnt the solid coal is turned into gas, a large portion of the heat becomes latent, and is wasted by volatilising the solid. The oxygen of the atmosphere is a gas by reason of the large amount of heat combined with it. When zinc, iron, or maganese are burned, the resulting oxide is a dense solid; little or no heat is wasted, as it is not turned into vapour. In addition to this, the inventor obtains the cosmical heat latent in the oxygen of the atmosphere, and the result is that one pound of zinc will evaporate more than four times as much water as one pound of coal, the advantage of which on long sea voyages is obvious. The zinc, or other metal, thus becomes a vehicle of power, much larger than can be obtained from the same weight, or bulk, of coal, and the oxide of the metal may subsequently be economically reduced at any convenient place where coal is accessible. The following is the manner in which it is proposed to carry out this invention:—The furnace of the boiler is divided into two or more parts; first, the hearth or grate on which the metal is burned (in this description we will confine ourselves to the metal zinc); secondly, a chamber behind the hearth to collect the oxide. In the case of tubular boilers, the heated gas from this chamber is made to circulate through the tubes. This furnace has the bottom and sides, and sometimes the top, also, of brick, fire-clay, or any other refractory substance. The air is admitted over the combustible metal, or by a blast throng the same; in the latter case, pipes, or tuyeres, are built in the bottom or sides of the furnace. Whether this method proves practically successful or not, it certainly has a basis. Every one knows what a small portion of coal, compared to the iron, is used in the furnaces of iron foundries, and how the partial combustion of the iron itself increases the heat derived from the coal. The question of economy, however, is an important one.—*Iron Age* (U.S.).

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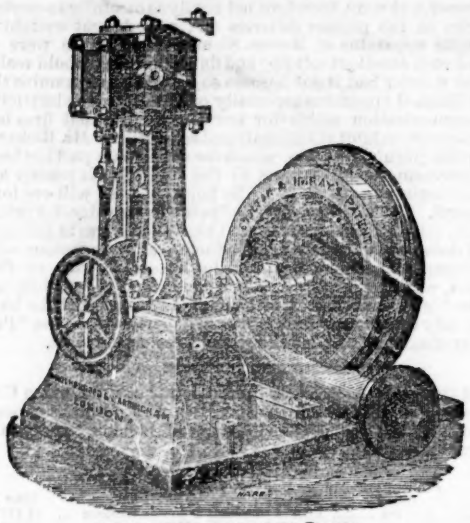

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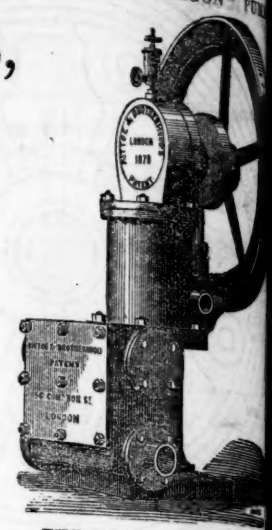

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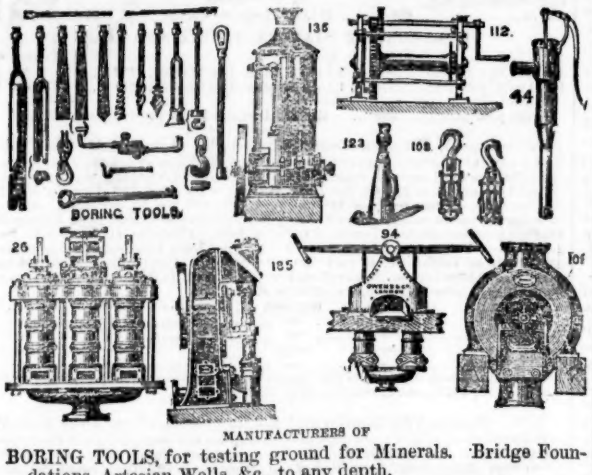

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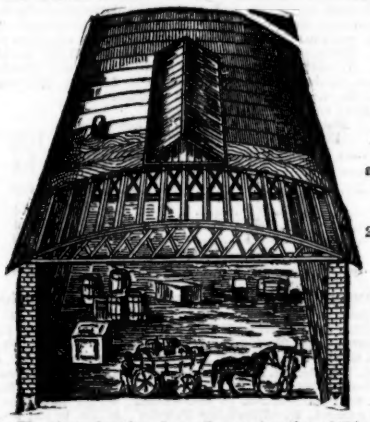

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